selves at the foot of the castle. A good example is the **castle-town of Okayama**. Based on a grid pattern of streets, zones for each class were established with the higher-ranked retainers closer to the castles, which were fortified with moats and ramparts. Many castles were constructed between the end of the sixteenth and the beginning of the seventeenth century, and construction techniques improved rapidly. The interior of the castle was divided into three parts. At the centre of the main compound was the donjon and keep; the second compound contained the residence of the lord and his family, while in the third compound were dwellings for the highest-ranked retainers as well as storehouses. The donjon was usually a five-storey building with its wooden members wholly coated in thick white plaster. It served as a landmark in the city. Loopholes were provided for shooting arrows and guns, and machicolations for dropping stones.

**Himeji Castle** (p.741C), built between 1601 and 1614, represents the highest achievement in Japanese castle architecture. It is the sole example in which almost all the buildings other than the donjon still survive today. In addition to the usual compounds, turrets (yagura), turret-gates (yagura-mon) and earthen walls were constructed within the castle complex. However, the donjon was higher than usual; it had six storeys with a series of pent roofs, undulating gables and decorative dormers. Three small donjons (ko-tenshu) are connected by corridors linking the turrets. For defence purposes, gates were complicated by maze-like spaces to confuse the enemy.

The **Nijo Castle** (Kyoto) (p.742A) was built in 1603, for Ieyasu Tokugawa when paying respects to the emperor. The ni-no-maru (the second compound) residence was partially reconstructed on a large scale in 1624. Facing a pond, the residence is actually composed of six sections in staggered arrangement, containing rooms for shogun warriors and guests; the most important are the grand hall (ohiroma) in the centre of the complex, the unofficial audience hall (Kuroshoin) and the private abode of the shogun (Shiroshoin). Each of these halls contains a jodan-no-ma, a raised floor area reserved for the shogun, with an alcove (tokonama), staggered shelves (chigaidana) and a writing alcove (tsukeshoin). The walls, fusuma screens and ceiling were coated with gold leaf, decorated with pictures, patterns and metal ornaments.

In the seventeenth century aristocrats and cultured warriors in Kyoto developed a type of villa, containing many elements of the tea ceremony room, where they could relax. **The Katsura Detached Palace** (p.742B) is an example of such a residence in staggered plan, containing tea ceremony houses and gardens with bridges, stone lanterns, ponds, streams and artificial hills. The palace design has an informality contrary to the rigidly arranged warriors' dwellings.

Townhouses (machiya) for merchants and craftsmen were generally constructed on limited sites with narrow frontages but with considerable depth. The fronts, open to the street, served as shops. Earth floors ran along one long side of the buildings, serving as passageways from the street to rear yards. Rooms were also aligned along the passages, and small inner courts brought fresh air and light to the rear of the main rooms.

After the seventeenth century the scale of farmhouses as well as townhouses increased, and construction became more sophisticated in regions where the local economy had improved. Structures were completely coated with a type of stucco to protect them from fire, and the use of tatami in reception rooms became common. Even in folk dwellings (minka) characteristic forms were originated and developed particularly in the structural members visible in the space above the earthen floor. The structure was made up of hand-hewn beams supported by stout struts.

Takayama City, originally a castle town, developed into an industrial and commercial city after the eighteenth century. **The Yoshijima** family prospered in the nineteenth century, and descendants rebuilt the family house (pp.743A,B) in 1907 after a big fire in 1905. It retains the cultural traditions of earlier times. The main house, built on a plot 27 m × 66 m (89 ft × 216 ft), faces the street. Within it there is a long earthen passageway, along which there is a double row of ten rooms, the inner rooms of which have no separate access.

The **Yoshimura House** is a rural farmhouse situated south of Osaka City. It was one of the largest in the region in the sixteenth century. From the early eighteenth century, the Yoshimuras served as headmen over eighteen villages. An old drawing depicts a large village residence which includes a main house, an entrance gate, plastered storehouses (dozo), and other subsidiary buildings set in spacious grounds. The original main house was burnt down in 1615 and was reconstructed in the 1620s. The later structure had a large earthen floor and several rooms, to which were added reception rooms in the style of warriors' residences. Most characteristic is the earthen floor with huge transverse beams above it. Adjacent to the earthen floor is a small planked area which served as an entrance to the rooms.

## Bibliography

A bibliography covering both Chapter 22 and Chapter 36 will be found on p.1254.

Although as a rule restrained in character and limited in extent, certain Buddhist buildings in the later periods became almost as exuberant in their ornamentation as many Hindu buildings in the north-west; familiar Hellenistic motifs, such as garlands, gryphons and acanthus leaves, were combined with more exotic ones—double-headed eagles, elephants and winged divinities. In the central Indian monuments (for example, at Sanchi and Ajanta) the indigenous love of ornament asserted itself strongly, and the female figure in its most voluptuous form was often used with apparent disregard for Buddhist rules of asceticism. Painted wall decoration was common and ranged from formalised architectural motifs to elaborate and beautiful 'genre' painting, for example on the cave walls of Ajanta—invaluable social and architectural records of the period.

In Sri Lanka architectural history began with the introduction of Buddhism in the third century BC and evolved in Anuradhapura, the capital city, up to the end of the first millennium. From modified natural rock chambers and enclosed rock temples to the eventual sophistication of a stone-framed peristylar architecture, Anuradhapura grew to be one of the most remarkable of monuments to Buddhist culture. Buried in the jungle for five hundred years, its isolation protected it from vandals and restorers alike. Columns were square or octagonal in section and carried hexagonal, vase-shaped capitals with carved abacus above and varied mouldings below. The unique city of Sigiriya, built around and upon a massive outcrop of rock, dates from the middle of this period (sixth century). Cholan incursions from southern India forced the removal of the capital southwards to Polonnaruwa in the eleventh century, and the classic Anuradhapura style evolved further—temples were expanded to enshrine huge images of the Buddha and planned with corridors for processions: the circular image house was created for the first time. Although Sri Lankan art and architecture as a whole declined after Polonnaruwa was abandoned, there were isolated exceptions, as at Yapahuwa in the fourteenth century and at Gampola, which reflect the earlier periods and herald the Kandyan style which continued the decorated timber-framed tradition which at Anuradhapura had been executed in stone.

The sparse architecture of Afghanistan combines the western Classical influences of the Graeco-Bactrian kingdoms noted above in relation to north-west Pakistan (for example, at Taxila) with the Buddhist art and architecture which flourished in Gandhara in the foothills of Kashmir from the second century BC to the fourth century AD, following the decentralisation of power which followed the death of the Emperor Asoka (232 BC). Ruined stupa mounds abound along the Kabul River and around Kabul itself: the most significant monuments are at Bamiyan and Hadda.

Gandhara

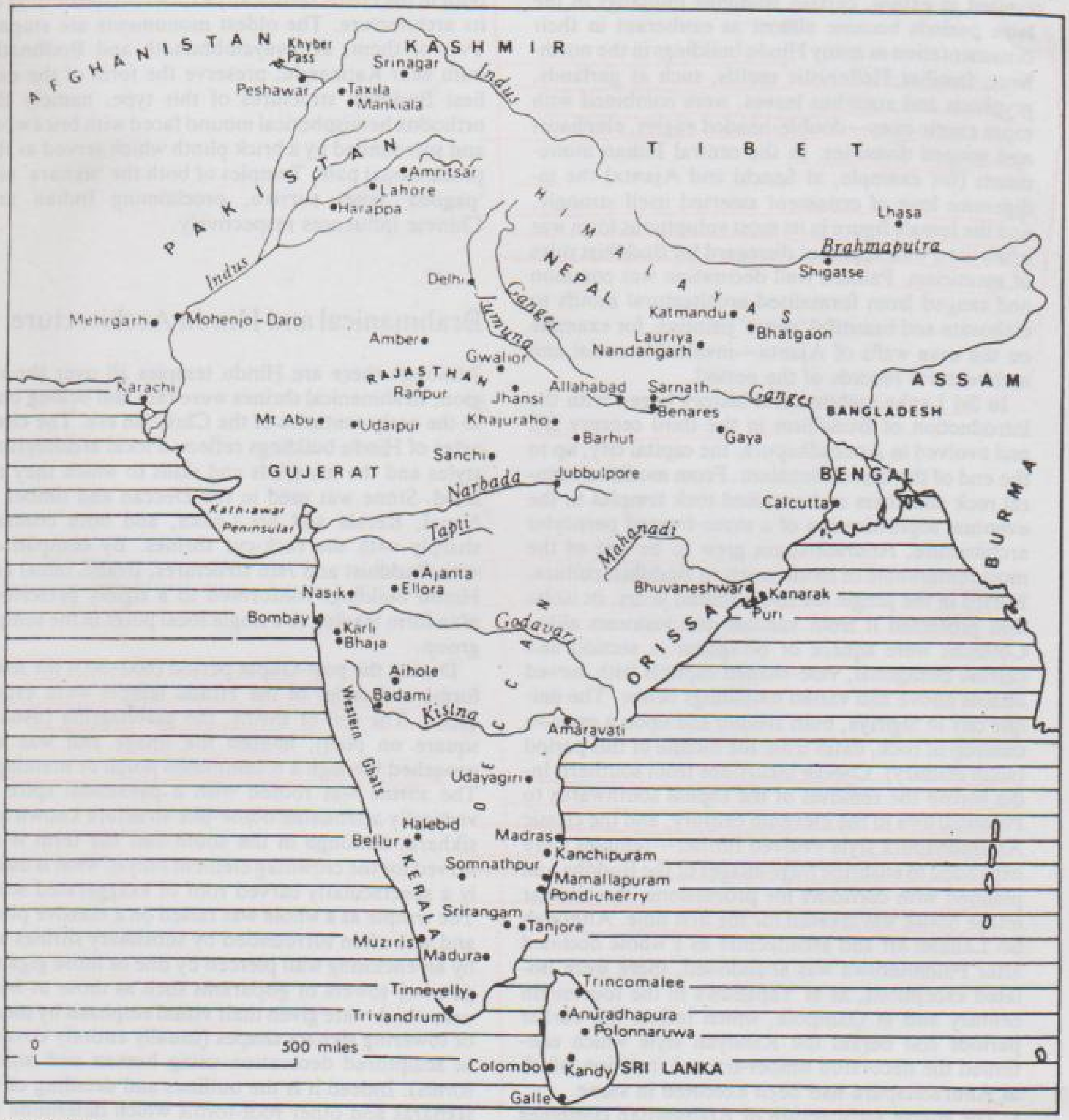
Nepal draws deeply upon the two great cultures of India and China between which it lies, and reflects both in the characteristically exuberant decoration of its architecture. The oldest monuments are stupas. Two of them, at Swayambhunath and Bodhnath, both near Katmandu, preserve the form of the earliest Buddhist structures of this type, namely the orthodox hemispherical mound faced with brickwork and surrounded by a brick plinth which served as the processional path. Temples of both the 'sikhara' and 'pagoda' types survive, proclaiming Indian and Chinese influences respectively.

## Brahmanical and Hindu Architecture

Although there are Hindu temples all over the region, Brahmanical shrines were rare and belong only to the early centuries of the Christian era. The character of Hindu buildings reflected local architectural styles and the materials and skills to which they related. Stone was used in the Deccan and timber in Nepal, Kerala and Sri Lanka, and both contrast sharply with the rock-cut shrines. By comparison with Buddhist and Jain structures, Brahmanical and Hindu buildings conformed to a rigidly prescribed plan form leading to a single focal point in the temple group.

During the post-Gupta period (600–800) the main forms and styles of the Hindu temple were established. The cell or shrine, the garbhagriha (usually square on plan), housed the image and was approached through a columniated porch or mandapa. The shrine was roofed with a pyramidal spire or vertically attenuated dome-like structure known as a sikhara, although in the south-east the term is reserved for the crowning element only of what is usually a spectacularly carved roof of exaggerated scale. The temple as a whole was raised on a massive plinth and was often surrounded by subsidiary shrines and by an enclosing wall pierced by one or more gigantic gateway towers or gopurams such as those at Madura, which were given their visual emphasis by means of towering sikhara shapes (usually entirely covered in sculptured decoration using human and animal forms). Indeed it is the outlines and detailing of the sikharas and other roof-forms which determine the character of monumental Hindu architecture and give a formal, as opposed to historical, basis for its classification, as follows.

*Temples with curved sikhara roofs.* Sikharas with sides curved slightly inwards towards the top are often compared with a peeled orange (amalaka). More precisely they take the form externally of a stilted dome, curving inwards quite steeply at the top to a decorated disc or crown surmounted by a finial. Well-known examples from the great ninth- and tenth-century temple-building period are at Khajuraho (central India) and Bhuvaneshwar (Orissa), and



South Asia

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detail was used to emphasise rather than to conceal structure—almost in the western Classical tradition. This is especially noticeable in the north-west (the old Bactrian kingdoms), where near-replicas of Hellenistic buildings occur, for example the Zoroastrian temple of Jhaulian, Taxila. Both Corinthian and Ionic orders were used in a distorted, but clearly recognisable, form. Virtually no secular buildings remain, but the excavated parts of the city of Sirkap (Taxila) (200 BC–AD 200), show it was neatly laid out on a rectangular grid and dominated by an 'acropolis' containing a monastery and stupa. The acropolis appears again in other civil settlements, such as Mingaora in the state of Swat, Pakistan.

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divinities) above a heavy base with deep-cut mouldings. In the south the heavy cushion capital also appeared, but in later periods the decoration became so lavish that the column lost its identity and assumed the character of free-standing sculpture.

By contrast with the restraint of Buddhist architecture, Jain and Hindu ornamentation was exuberant—based on an appreciation of human and animal forms in their most sensual manifestations. At its best, the sculpture was emotive and beautiful, but easily deteriorated into mere virtuosity and repetitive monotony. In the earlier and finest examples the ornament was perfectly related to the buildings it adorned, but later became dominant.

## Examples

### Buddhist Architecture

#### *Stupas*

Stupas are the most spectacular of Buddhist monuments. They originated as prehistoric burial mounds at the bases of which important personages were interred. Subsequently, burial chambers were added centrally within the mounds above the sarcophagi to conceal and secure sacred relics. In due course, the whole structure of stupas was given monumental form in brick or stone masonry. An umbrella or canopy was placed above the mound to add to the symbolism and as a mark of respect and distinction. The single umbrella shape grew into a number of superimposed canopies and eventually took the shape of a cone, known as a chatravalli. The protective fence around the stupa-mound also became a major feature. Originally made of timber, these fences retained their timber form even when constructed in stone or brickwork. There are four entrances or gateways (thoranas) through the fence and these face the cardinal points. Thoranas are used on ceremonial occasions in south Asia even today.

Stupas reached colossal dimensions and are among the largest of all architectural monuments. Usually simple and unadorned, they rely upon outline and impressive scale for effect, and ornamentation is reserved for certain focal points. What began as burial mounds are now often thought of as domes, as stupas have assumed a number of domical shapes from the simple convex curve with various degrees of elevation to diameter, through a range which includes cylindrical, bell-shaped, vase-shaped, paraboloid and stepped pyramidal forms. They have a number of subsidiary elements: terraces on which devotees gathered for ritual and worship (in early examples imposing thoranas gave access to the terraces and in later stupas formal flights of steps led to terraces paved with plastered brick or faced with stone slabs, and more elaborate buildings sometimes had outer terraces used for processions); the 'berm', which consisted of one, two or three steps at the base of the dome itself, was originally intended for walking around it when offerings were placed at the altars facing the cardinal points, but was used as the flower-terrace when the ritual was modified to exclude the original use; relic chambers, which might be numerous (whilst the main enshrinement was usually at the base of the dome, relics were also deposited in sealed chambers, often plastered and delicately painted, one above the other on the central vertical axis of the stupa, the last one immediately below the crowning chatravalli); the protective fences described above eventually developed into a square base for the dome and the crowning cones were often surmounted by a gilded finial with a crystal at its tip which flashed spectrum colours in sunlight or moonlight. But the focal point of the stupa was the altar at its base upon which, originally, the devotees placed their offerings but which eventually became an elaborate central niche for an image of the Buddha and a repository for the ashes of royalty.

Also, a number of stupa-houses of both rectangular and circular plan shape remain in which smaller stupas are housed within the buildings.

There is an important group of stupas at Sanchi in central India, dating from the first century BC. **Sanchi Stupa No. 3** is domical, and **Stupa No. 1** (previously known as the **Great Stupa**) (p.748C) is similar but of flatter section. The mounds, terraces and staircases are faced in stone, and the fences (p.750A) and thoranas (p.750E) at the cardinal points, which are preserved in these examples, are constructed in stone as in the **stupa at Amaravati** (third century) near the mouth of the River Kistna in eastern India. The thoranas resemble and may have inspired the Chinese pai-lou and the Japanese torii (q.v.). The protective fences are well preserved also around the **stupas in the Jetavana, Anuradhapura,** Sri Lanka, and the **stupa at Barhut** in central India, and at both Barhut and Sanchi, thoranas were decorated with low reliefs, depicting the stories from the Jatakas or historical events relating to the life of the Buddha. In the early phases the image of the Buddha was not used as it was not canonically acceptable, but as early as the second and third centuries at Amaravati there are fine examples of the Buddha figure, placed at the base of the dome.

There was a cylindrical **stupa at Sarnath** (sixth century), near Benares on the River Ganges, which had the multiple umbrella form at its crown, and was ornamented with figures of the Buddha in shallow aedicules. The pyramidal **prasada stupa at Polonnaruwa** (eleventh century) (p.748B) is square in plan and seems originally to have had seven levels, as its old name, the Sat Mahal Prasada, indicates. Little remains of the seventh storey, but each of the six lower levels has a rudimentary entablature and semicircular-headed aedicules housing high-relief figures on each side: the arches break the entablatures except on the sixth level, where the outer line of the arch coincides with the bottom of the entablature which is also supported by shallow pilasters. A staircase rises from the ground to the first level only. The **stupa at Mahiyangana**, Sri Lanka, was bell-shaped and had a superimposed conical chatravalli.

The colossal **stupas of Bodhnath** (p.753A) and **Swayambhunath** (p.753B), **Katmandu**, and the **stupa at Lauriya**, also in Nepal, are all brick-enclosed. The first two are both paraboloid in outline, the former a flat curve rising from three massive terraces and surmounted by a stepped pyramidal pinnacle, itself crowned with an open-work drum carried on slender legs which slope outwards, apparently precariously, from the top of the pyramidal superstructure; the equivalent of this at Swayambhunath has an inward-curving outline formed by what appears from the ground to be a series of discs, also surmounted by an open-work drum.

In Sri Lanka the largest stupas, built in brick, reached immense heights: the **Jetavana stupa, Anuradhapura** (fourth century), is 120 m (400 ft) high and in the same city the **Abhayagiri stupa** (first century BC) *is 111 m (370 ft) and the* **Ruwanveliseya stupa** (second century BC) (p.753C) is 90 m (300 ft). The last is typical of the brick stupas (or dagabas) of Sri Lanka, plastered white with a conical crown on a square pedestal. It stands on two terraces and has a pillared portico and steps on one side of the lower terrace. The **stupa at Sah-ji-ki-Dhevi near Peshawar** in Pakistan was reported to be nearly 210 m (700 ft) in height by a Chinese pilgrim in the seventh century, but has since disappeared altogether.

In India few free-standing indoor stupa-halls remain, but there are **rock-cut halls at Bhaja** (250 BC), **Nasik** (129 BC), **Karli** (78 BC) (pp.754A, 757B), **Ellora** (*c.* seventh century) (p.754B), and **Ajanta** (AD 250) (p.754C). They are rectangular, apsidal-ended halls with closely spaced pillars at each side, forming aisles or ambulatories. A stupa is placed in the apse, furthest from the entrance. The roofs are semicircular in section, and ribs representing the original timber members of the prototypes are cut from the rock. The facade usually contains, above a low entrance portico, a horseshoe-shaped window filled with rock-cut or wooden tracery which admits light to the interior. At Karli the hall is 38.5 m (126 ft) long and the height and width are 13.7 m (45 ft). The octagonal columns are of the Persepolitan type and the capitals take the form of elephants (p.754A). The bases, shaped like inverted vases, are an indigenous form. The roof ribs in this case are actually of wood, inserted after the roof was cut.

There has been much conjecture about the rotunda form of indoor stupa-shrine which is unique to Sri Lanka. The best example is **the Watadage at Polonnaruwa** (twelfth century) (p.755A,B). The walled shrine which contains the stupa is 17.7 m (58 ft) in diameter. The enclosed stupa at the centre of the Watadage was surrounded by several circles of stone columns that supported a conical roof and several other subsidiary roofs below it. There was clerestory lighting. Stairways on all four sides have the typical Sinhala carved moonstone thresholds, 'makara' balustrades and guardstones. There are other small indoor stupas in wooden stupa-houses in Nepal.

### *Bo-Tree Shrines*

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The Buddha, Gautama (*c.* 563–*c.* 483 BC), found enlightenment at Buddh Gaya in South Bihar, seated on a stone seat (vajirasana) under a Bo-tree (banyan). Both Bo-tree and vajirasana became the objects of worship, not only at Buddh Gaya but in many other places in India and Sri Lanka.

There is a second-century BC relief at Barhut which depicts the tree and the stone seat surrounded by thirty-two columns supporting a roof which circumscribes the tree on all four sides. The centre was left open to the sky to allow the branches to spread above the building. It is a four-sided edifice with a court in the centre containing altars and is referred to as a bodhighara. There are many **Bo-tree shrines** in Sri Lanka—for example, the square plan at **Puliyankulama**, circular at **Menikdena**, rectangular at **Nillakgama** (p.757C), and those with a roof only over the vajirasana as at **Kudapulanchi**. There are various arrangements of the shrines themselves. The shrine at **Vessagiriya, Anuradhapura**, consisted only of the tree, a fence and the vajirisana: it has a very early railing design reminiscent of relief sculptures of the second and first centuries BC. At **Lankatilaka**, near Kandy, the shrine had a shelter off the central axis to protect the vajirisana and a protective wall and a narrow stairway to a platform from which to water and tend the tree. The shelter, which was of timber, rested on stone columns. The shrine at Kudapulanchi (*c.* eighth century) had an outer enclosure and gateway as well as a sheltered vajirasana and fence. A peripheral stone wall encloses the compound and is pierced by a roofed gateway. The massive vajirasana stone and four stone pillars which held a tiled timber roof can still be seen today.

At Nillakgama (eighth century) (p.757C) the entire Bo-tree compound is housed in a bodhighara, covered except for an opening which permitted the tree to grow through it. A stairway provided access to the central plinth and an underground drain carried water away from the sheltered area. Stone columns supported the terracotta-tiled timber roof. A line of stone elephants decorated the high stone wall which screened the inner sanctum. Doorways to the north and the south gave access to the shrine in which the vajirasana was centrally placed.

simplicity notable by comparison with many of the gopurams of medium scale, for example those of the **Brhadesvara Temple at Tanjavur** (early eleventh century), with their bewilderingly complicated forms—in this case highly decorated horseshoe-gabled pavilions and, on the inner gopuram, long and short barrel vaults intersecting at the apex (p.780B).

## Later Temples: Moghul Influence

The parallel evolution of Islamic architecture in Pakistan and India is dealt with in Chapters 15 and 17, but it would be a mistake to suggest by the arrangement of this chapter that there were no cross-cultural influences between, for example, Muslim and Hindu temple buildings from the period of more liberal Moghul rule under Akbar (the Great) (1542–1605). His power spread from the north-west through conquests over the Rajputs in central India, over Gujerat in the west and over Bengal in the north-east. In all of these areas there are Hindu temples which demonstrate Moghul influence. Almost contemporary with Akbar's Fatehpur Sikri is the **Govind Deva Temple, Brindaban** (late sixteenth century) (p.781A), with pointed Islamic arches and suggestions of Islamic surface decoration. A century or so later, the **Temple at Kantanagar, near Dijanpur,** Bangladesh (1707–22), is regarded as typical of the Bengali style with its upward-curving cornices, also reflected in the form of the central pavilion. Although its nine towers have sikhara-shaped roofs, the impression given by the building is dominated by the Islamic pointed arch forms, and above all by the all-enveloping tiled surfaces. Another well-known example, completed after rebuilding half a century or so later, is the **Golden Temple at Amritsar** (rebuilt after the Moghul depredations of 1761, in 1766) (p.781B). The Sikh religion was an attempt to reconcile Hindu and Moslem beliefs. The temple was rebuilt on a platform in the tank in which the original building—called Hai-mandri—had stood, and was connected to the bank with a marble causeway. The arch forms, the panelled surface decoration, the shape of the domes and the chattris which surmount each corner of the square building leave no doubt about the Moghul influence—perhaps a result of the Sikhs' wish to avoid in their beliefs what they saw as the idol worship of the Hindus. The name of the Temple relates to the gilt-copper used to cover the domes.

## Secular Architecture

Apart from archaeological sites, the earliest extant secular buildings date from the mediaeval period. A notable example is the brilliantly colourful **Man Mandir** palace of **Gwalior Fort** (*c.* 1500) (p.782A) built by Man Singh (1486–1518) in an indigenous Moghul-influenced Hindu style. Built a century before the reign of the tolerant Akbar, the flat surfaces rising from the rock on which the palace stands are broken by projecting circular towers with domes of gilt copper. Other buildings were added during the first quarter of the sixteenth century by Shah Jehan and others, resulting in a picturesque group of palaces unrivalled in central India. Also in northern India, are the palaces of **Bikanir, Jodhpur, Orchcha, Datia, Udaipur** (p.782B), and that at **Amber** (Jaipur), begun a century or so later by another Man Singh (1542–1625), and completed in the seventeenth century. Unlike Gwalior, Amber shows little that is Hindu in character; like many buildings built during Akbar's regime, it displays the strength of his influence in changing the architecture until it became distinguishably Moghul in feeling. In the south are **Vijayanagar** (sixteenth century) and the **Palace at Madura** (late seventeenth and eighteenth centuries), which also shows traces of European precedent in the pillared halls.

In Indian towns, the formal plan according to the ancient law books (the Manasara), with its four main avenues aligned at right angles, is perhaps best seen at **Jaipur** (eighteenth century). Houses alternate with temple facades and noblemen's residences.

Other typical buildings are the 'ghats' or public bathing places, inseparable from town or village life, ablutions playing an essential part in Hindu social and religious ritual. They consist of broad flights of steps leading down to a tank or river. At Benares (p. 782C), the **ghats** stretch for nearly 5 km (3 miles) along the banks of the Ganges river-front. Above them the fortress-like palaces present massive ramparts, with rounded bastions of masonry to withstand the action of flood water. The upper storeys have overhanging balconies, latticed windows and pillared loggias. The dams of the artificial lakes necessary for irrigation were often of great significance, with steps, temples and pavilions interspersed with fountains and sculpture, as at Udaipur. A number of **observatories** were built in the seventeenth century, of which there were fine examples at **Jaipur, Benares** and **Delhi**. That at Benares was added to Man Singh's palace on the ghats at the end of the seventeenth century. Much of it was destroyed and insensitively rebuilt in the nineteenth century, but delightful stone balconies remain from the original building (p.781C).

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great climatic, geographical and ecological variability of the areas settled by Neolithic, Bronze and Iron Age peoples. Neolithic farming practices appear to have originated in the more favourable conditions of Greece and the Balkans (see Chapters 5 and 6) and spread to the coastal regions of the Mediterranean. This was followed by a major expansion of farming across central Europe, accompanied by more uniform cultural practices in house-forms and pottery. Modifications in the environmental conditions also brought about changes in the methods of construction of houses and led to the architectural developments which are the subjects of this part of the book.

Bronze Age peoples were efficient mixed farmers and increased the size and density of settlements, although not, on the whole, their architectural complexity. Settlements were on low-lying sites near water, except where natural defensive positions were exploited and incorporated into fortified settlements.

Throughout the Iron Age, farming efficiency increased still further and extensive field systems covered large areas of Europe. Iron Age settlements associated with them occupied defended sites. Fortified villages and townships predominated on the continent, whilst small, isolated palisaded hamlets and farmsteads were more typical of the British Isles.

Thus it was for climatic and topographical reasons, as well as for defensive and economic ones, that in the first millennium BC ethnic movements were southward and westward to the seaboard of Asia Minor, Greece, Italy and Sicily. In Italy the mineral wealth was concentrated in Etruria, and it was to the iron of the island of Elba and the copper and tin of the adjacent mainland that the rise of the Etruscan civilisation was due. These provided the means of economic exchange and were the principal materials of its manufactures, its crafts and its arts.

From being a vassal pastoral settlement under Etruscan domination, Rome established her power and had united most of Italy by the time of the first clash with Carthage in 264 BC, and at the end of another fifty or sixty years, and a series of three Punic wars, had acquired an overseas empire with footholds in Africa and Spain. The Roman empire was to grow to dominate the whole of Europe, and with the eventual formation of the eastern empire at the end of the fourth century (Plate 2), stretched from Dacia in the north-west to Egypt and Palestine in the south-east, and included the whole of Macedonia and Asia Minor to the shores of the Black Sea. The post-imperial decline and disintegration was followed by the development of Germanic and Frankish power; by the end of the tenth century western Christendom comprised about half of Spain, all modern France and Germany west of the Elbe, Austria, Italy and England.

The Romans had been masters rather than servants of topography, and aqueducts, bridges, roads and fortifications bear witness to a remarkable consistency of architectural as well as engineering achievement; an attitude which tended to ignore the physical characteristics of the terrain was perhaps essential in an empire so widely dispersed and so dependent upon its communications and its defences.

Nevertheless, the Byzantine buildings of the eastern empire, and the Romanesque buildings which emerged in western Europe, reflected the climates in which they evolved—from the sub-tropical sunshine and high temperatures of the east to the duller, colder conditions of the north and west. Typically, in the south, there were low-pitched and even flat roofs, with a few small windows, and thick walls to reduce the daytime effects of the sun; in the north, there were larger windows and more steeply pitched roofs to combat rain and snow. And it is to Romanesque architecture, evolved for the climate and topography of northern Europe, that the Gothic style owed its origins.

In spite of the Romans' ability to overcome local obstacles, the importance of topography to the evolution of European architecture can be clearly exemplified in France, for example, by the spread of ideas along the valleys of the Rhône, Saône, Seine and Garonne which connect the Mediterranean with the Atlantic Ocean and the English Channel. The different territories into which the country was divided, for instance in the Romanesque period, had strongly marked architectural characteristics, partly due to the difference in geographical position. Roman civilisation had spread along the Rhône valley, and the influence of the architecture of Rome itself is everywhere evident. Somewhat later, the trade route from the Mediterranean along the Garonne valley carried Venetian and eastern influence across the south-west of France to Périgueux, in Aquitaine, the centre of an area endowed with a large group of churches exhibiting eastern Mediterranean inspiration which can be traced specifically to Venice and Cyprus. The influence of the Norsemen who came by sea is apparent north of the River Loire, as well as that of the Franks who overran the country from the Rhine to Brittany.

It is generally agreed that the Gothic style was first fashioned in western France during the middle and later years of the twelfth century, whence it eventually spread, either by the movement of French architects or the imitation of French examples, into every part of mediaeval Europe. During the thirteenth and fourteenth centuries, it became an architectural lingua franca. In Italy it was progressively rejected during the fifteenth century, but elsewhere its predominance remained unquestioned until well into the sixteenth century; and there were places such as Bohemia and Oxford where it was never quite forgotten, even in the eighteenth century. From then on it was deliberately revived, most enthusiastically perhaps in England; and many of the best Gothic buildings were actually completed or even newly built in the nineteenth century.

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Doubles

## History

### The Prehistoric Periods

The sophistication and complexity of societies in the Paleolithic period were reflected in the early evolution of large-scale, relatively permanent buildings with cache-pits and areas designated for specific activities. Hunting bands were known to have varied in size from as few as twenty to twenty-five people in western Europe to well over one hundred members in parts of eastern Europe. The composition of residential groups can only be guessed at. There was some regional exchange of raw materials and artefacts between culture groups. The many status items and objects of symbolic value found at some sites, and the specialised burial treatment of selected individuals, suggests that there may have been differentiated roles and statuses even at this early stage of development.

During the Mesolithic period, population densities increased throughout Europe, but the sizes of local groups contracted. As economies became more diversified, many adopted a semi-nomadic existence, seasonally exploiting the range of ecological conditions. Identifiable regional differences appeared in house-forms and the arrangements of settlements, in burial rites, and the associated artefacts. The exchange of goods and materials took place across considerable distances. Within local groups the differences between rich and poor became more pronounced.

Economic changes during the Neolithic period often involved the change from hunting and gathering to arable or pastoral farming, and this was accompanied by an increase in population and subsequent changes in the social structure. Archaeologists argue that large-scale monumental architecture is evidence of social inequality.

Long-distance trade, already well-established by this time, increased in scale and geographical range during the Bronze Age, and was reflected in the use of horses for riding and driving, the development of wheeled vehicles, and increased sophistication in boatbuilding and in the use of trackways. At the same time, regional cultural differences were strengthened, the diffusion or replacement of one form of society by another appears to have taken place at an increasing pace, and the gap between rich and poor widened. Characteristic of the later Bronze Age was the rise of fortified hilltop settlements and stockades. This began about 1000 BC, and generated the forms of fortification architecture which are linked with a less relaxed social atmosphere, although many fortifications may have been predominantly of strategic or symbolic significance.

During the Iron Age, highly stratified tribal societies appeared throughout Europe, with chiefly or princely rulers, warrior aristocracies, specialists in ritual and in the crafts. There were industrial areas, for example, smelting iron, working metal and producing salt, whilst in other locations centres of distribution were established. The pace of life quickened both through the internal developments described above and through contacts with the Mediterranean world, which lent technological and cultural impetus to the Iron Age societies of inland Europe. The societies of the Celtic world were technologically on a par with those of the Classical world in the later Iron Age, particularly in agriculture and the crafts, but by comparison were less unified politically.

### The Etruscans

The antecedents of the Etruscans, who occupied west-central Italy in early times, are uncertain. According to Herodotus, writing in the fifth century BC, they were immigrants from Lydia in Asia Minor. Whatever their origins, they had begun to establish a recognisable urban civilisation by the eighth century BC, initially in the coastal regions. In the following century this civilisation spread to other centres further inland, and Etruscan sea power grew (as much by piracy as anything else) to challenge that of Greece in the western Mediterranean.

The zenith of Etruscan power was reached in the sixth century BC, when a loose federation of cities under Etruscan rule extended from the Po valley in the north of Italy to beyond the bay of Naples in the south; the rest of the country was occupied by a variety of other races including Ligurians to the north, Picenes to the east, Samnites and Latins in the southern-central regions, and Greek colonists around the coast in the south and in Sicily. At this time, Rome (founded according to legend in *c.* 753 BC) was still little more than a minor town in the southern part of Etruria, ruled by Etruscan kings aided by a form of popular assembly. But before the end of the century, Etruscan supremacy began to decline.

In 510 BC the Romans revolted against their king and established an independent city-republic which, by controlling the crossing of the Tiber, separated Etruria from its southern domains. Control in the northern plain was lost to the Gauls from further north, and Etruscan sea power was broken by the Syracusans, allies of Cumae, the oldest of the Greek colonies in the south. Further decline was accompanied by the rising influence and increasing dominance of Rome, and was marked particularly by the fall of the important city of Veii to the Romans in 397 BC; by about 250 BC the decline was virtually complete.

### The Rise of Republican Rome

After the expulsion of its Etruscan kings, Rome had gradually assumed the leadership of a league of Latin settlements banded together for mutual defence against the tribes in the hills further inland which gave way to Roman dominance when internal dissensions led to the league being dissolved in 348 BC. Part of the Roman genius was then to incorporate other communities as almost equal associates, and to give them rights as well as duties. This, coupled with an expansionist outlook and their qualities as thrifty, patient farmer-soldiers, enabled them to become effective masters of the whole of central and south Italy by about 273 BC.

The expansion of Roman influence generated friction with Carthage, and led to the first Punic War (264–241 BC) which ended with the annexation of Sicily as the first overseas Roman province. The second Punic War (218–201 BC) became a bitter struggle for survival. Hannibal, the great Carthaginian general, entered Italy from the north via Spain and the Alps to circumvent Roman sea power, which had now taken the place of that of the Etruscans. He defeated Roman armies and ravaged Italy for years until recalled to meet a Roman counter-attack, under Scipio, on Carthage itself. Scipio's victory at Zama (202 BC) broke Carthaginian power, but a subsequent revival caused the Romans to seek its final destruction, which they accomplished by the third Punic War (149–146 BC), and Carthage, with its territory, became a Roman province in Africa.

Conquest of Macedonia (168 BC) and Greece (146 BC) added two more provinces to a growing empire and served as stepping stones to the assimilation of the Hellenistic kingdoms of Asia Minor and the rest of the eastern Mediterranean world, the major part incorporated in the Roman province of Asia by 133 BC. The remainder was gradually incorporated over the ensuing century and a half. With the conquest of Spain and later Syria in 64 BC, Roman rule extended from the Atlantic in the west to the Euphrates in the east.

These prolonged and often desperate wars, and the resulting conquests, had their adverse effects. The earlier farming economy in Europe was badly disrupted by the drain of manpower, the damage wrought by Hannibal, and the import of corn from Africa. Refugees, slaves and the dispossessed flooded into the capital, and the resultant social unbalance was increased by the newly won wealth of those who had profited from the situation. These troubles were further aggravated by the need to maintain large standing armies far from home. For this purpose a citizen soldiery had to be transformed into professional armies, the effective control of which first exasperated and eventually defeated the old republican government.

A series of civil wars led to a succession of military dictatorships, of which that of Julius Caesar (49–44 BC) was the most successful. His brilliant campaigns in Gaul (58–49 BC) had established new northern frontiers along the Rhine and the English Channel. But his attempt to reorganise the system of government was cut short by his assassination. A further period of confusion and civil war ensued. A triumvirate, consisting of Marcus Antonius, Caius Octavius (Caesar's nominated heir) and Marcus Aemilius Lepidus, defeated attempts to revive republican government. After pursuing their rivalry for some time, Caius Octavius defeated Marcus Antonius at Actium in 31 BC and proceeded to add Egypt to the empire.

## Imperial Rome

It was Octavius who then re-established order and carried through the reorganisation that was necessary for the efficient running of the empire. He assumed the titles of Imperator and Augustus, and it is by the last that he is now best known. His long reign (27 BC–AD 14)—the Augustan Age—might be compared with the Periclean Age in ancient Greece. It was marked by a revitalisation of national life expressed in vast new building works and by the establishment of internal peace known as the Pax Romana.

Augustus, despite his effective personal assumption of all authority, never formally established dynastic rule. But, for the next half-century, he was succeeded by men who could make some family claim to what now became the imperial throne—Tiberius (AD 14–37), Caligula (37–41), Claudius (41–54), and Nero (54–68). However scandalous the abuses of power in their courts, the foundations laid by Augustus enabled development in the provinces to continue, so that these came to play an increasing role in the state. The only significant extension of the frontier was the inclusion of Britain, whose conquest was begun under Claudius. An event of more than usual architectural significance during Nero's reign was the great fire of AD 64 which, over nine days, destroyed a large part of the city of Rome.

Nero's suicide, without any obvious successor, led to a year of civil war during which the throne changed hands three times. An army commander, Vespasian, eventually restored order and founded the Flavian dynasty. During his reign (69–79) and those of his sons Titus (79–81) and Domitian (81–96), the frontiers were extended a little further in Britain and Illyricum (roughly modern Yugosalvia). A Jewish revolt was also finally crushed with the sacking of Jerusalem in AD 70. It was nine years later that Pompeii and Herculaneum were destroyed by an eruption of Vesuvius.

The murder of Domitian brought dynastic rule to an end. Subsequent emperors were adopted by the senate (though sometimes it was merely an endorsement of the reigning emperor's choice) from those considered to be most suitable, even if not of Roman origin. The reigns of Nerva (96–98), Trajan (98–117), Hadrian (117–38), Antoninus Pius (138–61) and Marcus Aurelius (161–80), collectively known as the Antonine Age, thus brought in new blood and gave increased importance to the provinces. Trajan, a Spaniard, was the first non-Italian, Hadrian was another Spaniard, while Antoninus Pius was descended from immigrants from Nîmes in Provence. Trajan and Hadrian were possibly the greatest emperors after Augustus. Under Trajan the empire reached its greatest extent with the conquest of Dacia and Parthia, and under Hadrian (p.163A), although there was some withdrawal on the eastern frontier, much was done to weld the provinces together in a fruitful partnership. The resultant stability permitted a great new burst of building activity. The closing years of the reign of Marcus Aurelius were marred, however, by plague, and by the first barbarian inroads on the Danube frontier. With the accession and subsequent murder of his unworthy son and successor, Commodus (180–92), this era came to an end.

## The Decline of the Western Roman Empire

The third century was one of political confusion, civil wars, barbarian inroads on the frontiers, and economic instability brought about partly by the costs of maintaining large armies. After another rapid sequence of emperors, relative stability was restored by the North African Septimius Severus (193–211) and his son Caracalla (211–17), but this did not last after Caracalla's murder. From *c.* 230 the pressures on the frontiers so dominated the affairs of government that a long succession of soldier emperors followed who were proclaimed in the field by their armies. Most ruled for a few years only, while the economy continued to decline and social life was increasingly disrupted. This decline was stemmed by the drastic reforms of the Illyrian, Diocletian (283–305), at the cost of his assumption of dictatorial power which he administered through a ruthless new bureaucracy. The reforms included a considerable measure of decentralisation, which greatly weakened the power of Rome by setting up new capitals in Nicomedia, Sirmium, Salonika, Milan and Trier. Diocletian himself ruled the eastern half of the empire from Nicomedia, there was a western co-emperor in Milan, and there were assistants (presumptive heirs, known as caesars) in Sirmium or Salonika and in Trier.

The Tetrarchy, as this system was called, did not, however, outlive Diocletian. Rivalries between his successors led to further civil wars from which Constantine finally emerged victorious—in the West by defeating Maxentius in 312, and then in the East by defeating Licinius in 324. Thus from 324 to his death in 337 there was again a single emperor, but now one that took all power into his own hands, and, exercising it in a manner that was more eastern than western or traditionally Roman, established a new dynasty.

Constantine's administrative system took over the principle of decentralisation introduced by Diocletian, with the empire divided into four prefectures. And he took two other decisions which were, in due course, to prove more momentous. First, in 313, he recognised Christianity as a religion equal to all others and himself began to favour it. Secondly, in 324 he chose to rule primarily from the East and chose as his capital not Nicomedia, but nearby Byzantium, and it was formally inaugurated in 330 as New Rome or Constantinople—City of Constantine.

Again the system did not long survive intact after the death of its founder. Inroads on the frontiers presented ever-increasing problems, particularly in the West, and effective control by a single emperor proved impracticable. The first formal partition of the empire occurred in 364 when Valentian became emperor in the West and his brother Valens in the East. Theodosius the Great (379–95) made one last attempt to rule the whole empire alone. But, after his death, the West was increasingly cut off from the now much richer and more populous East. In 407 the Rhine frontier was breached and barbarians occupied Gaul, severing the lines of communication with Britain. In 408 the Roman army withdrew from Britain and in 410 the Goths, under Alaric, invaded Italy and sacked Rome in spite of the protection of a strong new defensive wall, the construction of which had been started by Aurelian in 271 when the threat of invasion was first recognised. In the following decades the western provinces (including North Africa) were successively overrun and lost. Rome was sacked again in 455, and in 476 the last Roman emperor in the West, Romulus Augustulus, was deposed by the Goth Odoacer.

Thus, formally, the western empire might be said to have come to an end. Certainly it no longer existed as a single unit. But the break in Italy itself was not as dramatic and complete—or as significant for normal life—as this might suggest. Both Odoacer and his greater successor, the Ostrogoth Theodoric (490–526), saw themselves as continuing the imperial line; this was reinforced by their previous adoption of the Christian faith, which Theodosius had made the sole religion of the empire in 391. Indeed, Theodoric had ousted Odoacer with the encouragement and support of Zeno, the emperor in the East, and even their choice of Ravenna as the administrative capital was no break with the past, as it had already largely taken the place of both Rome and Milan in 404, when Honorius had made it his capital, leaving Rome as little more than a symbolic centre.

The final acts will be referred to in more detail below. There was first the attempt by Justinian to reunify the empire from his eastern base in Constantinople. Then, much later and after a more significant break during which much of Italy was ruled by

Lombard conquerors, there was a nominal revival by Charlemagne under the name of the Holy Roman Empire—a revival marked by his coronation in Rome by Pope Leo III in 800. Symbolised by this last act, and central to the continued importance of Rome once it ceased to be an imperial administrative centre, was the growing prestige of the See of S. Peter in the Christian West—a prestige confirmed by its growing wealth and temporal power as it stepped into the vacuum left by the collapse of other authority.

## The Eastern Empire from Theodosius to Justinian

The growth in importance of the new Rome in the East—Constantinople—and its eventual, almost complete, supplanting of Rome itself can hardly have been foreseen by Constantine. For much of the fourth century, its ultimate status remained uncertain, but it became clearer with the final partition of the empire in 395 and was fully confirmed in the course of the century which followed. From very small beginnings the city grew by the beginning of the sixth century to house perhaps half a million inhabitants, far outstripping the 200,000 or so to which the population of Rome must by that time have contracted from its peak several centuries earlier of around a million.

The eastern empire after the partition is now generally known as the Byzantine empire from the earlier Greek name of the city, Byzantium. However, the name should not be allowed to obscure the very real continuity with the eastern empire of Rome which had come into being many centuries earlier and had already assimilated much from the Hellenistic kingdoms it absorbed.

That eastern empire was more fortunate than the western in being less subject to the pressures of land-hungry barbarian tribes from the north. Some pressure of this kind was felt in the Balkans, but the chief threat was posed by the Persian empire to the east, despite the existence of the semi-independent Christian state of Armenia as a buffer on the northern part of the frontier. Intermittent warfare with Persia was punctuated by uneasy truces. In the early sixth century the greatest of Byzantine emperors, Justinian (527–65), nevertheless felt himself strong enough to attempt the reunification of the whole empire by the reconquest of the West. He came near to success, winning back the whole of North Africa, southern Spain and Italy. But the cost was high, especially that of the prolonged fighting in Italy as a result of which the whole economy suffered. Further damage was done in the latter part of his reign by serious outbreaks of bubonic plague which caused great loss of life.

## The Byzantine Empire after Justinian

Justinian's successors had to concentrate increasingly on defending the eastern and Balkan frontiers, with the result that northern and central Italy (with the exception of an area around Ravenna), southern Spain, and much of North Africa were soon lost again to Lombards, Visigoths, and Berbers. Heraclius (610–41), after ejecting the ineffectual usurper Phocas, carried through reforms to meet the new situation. These included setting up an army based on local manpower rather than on mercenaries and the removal of the sharp division between civil and military authority retained since the time of Diocletian. He succeeded in defeating the Sassanian empire in Persia, only to be forced by Arab attacks to relinquish direct control of much of the Balkans. The Arab attacks developed so rapidly in the few years after the death of Mohammed (632) that Damascus fell in 635, and the whole of Syria was lost soon afterwards, as was Jerusalem. To the north Armenia fell and all of Egypt in the south. Arab raiders even penetrated deep into Asia Minor (see Chapter 13). Heraclius, therefore, looked out finally on an empire reduced to about half the size it had reached under Justinian (see Plate 2).

Deprived of some of its richest and most populous provinces, the empire was never to return to anything like its earlier position. Its fortunes fluctuated. The Arabs, for instance, soon turned to easier conquests in North Africa and Spain. But cities declined, Ravenna was lost in 751, and there were further and more dangerous attacks on the Thracian frontier. Under Basil I (867–86) and the dynasty he established, there was a revival, reflected in new building activity, but this was followed by successive waves of Turkish infiltration from the east and by the depredations of crusaders in the thirteenth century.

Constantinople had become as central to the Byzantine empire as Rome had long been to the Roman empire, so that its loss in 1204 to Latin crusaders could well have been fatal. As it was, the imperial administration moved to Nicea and the city was retaken in 1261 by Michael Paleologus. There was a surprising last recovery, but not sufficient to stem Turkish advance. For much of the thirteenth century and the first half of the fourteenth, a powerful Ottoman sultanate held much of Asia Minor and was also closing in on Constantinople through Thrace. The city fell to the young Sultan Mohammed II in 1453.

This was the end of the Byzantine empire as a political entity. But it was not yet the end of the Orthodox church—that branch of the Christian church with which it had almost become synonymous. This survived through centuries of Turkish occupation in the Balkans and even in parts of Asia Minor. It also survived until recently as a much more powerful force in Russia.

## The Romanesque Period

In order to take up the historical strands related to the burgeoning influence of the western (Roman) Christian church and with it the development of the Romanesque style, it is necessary to move back in time from the period during which Byzantine political power was eclipsed to that of the decline of the western Roman empire which led to the rise of the independent states and nations of Europe.

The coronation of Charlemagne as Holy Roman Emperor in 800 (see below) marked the beginning of a new era with the establishment of a new central European state, politically ordered and bound by both ecclesiastical and political ties to Rome. The Carolingian Renaissance was based upon a Germanic culture allied with late Roman traditions. The great monastic foundations, supported by imperial patronage, proliferated and expanded, closely linked with economic revival, the fusion of Latin and Teutonic communities, and the absorption of Roman Law into the monastic rule. New architectural problems were posed in the building of religious houses and often the monastic tended to take the lead in changes of fashion and technique. Many of the nations of Europe by the tenth century had struggled into existence. By the end of the eleventh century stable Christian kingdoms were established in Scandinavia and Norman England, while the Crusaders set up states in the Holy Land with less durable prospects.

### *Italy*

*Central Italy*. The Popes, although they had only small temporal domains, began to exercise influence in Italian politics. Pepin, king of the Franks, sided with Pope Stephen II against the Lombards, and restored to him Ravenna, the chief city of the Exarchate. In 755 Central Italy became independent under the Pope, and so inaugurated the temporal power of the papacy. Then Charlemagne, invited by Pope Adrian I (772–95), advanced into Italy in 774, defeated the Lombards and entered Rome. He bestowed the dukedom of Spoleto on Pope Adrian, the wealth of the Church rapidly increased, and the papal connection with Constantinople was broken off.

Pisa, like Genoa in the north and Amalfi in the south, sent merchant fleets to Constantinople, the capital of the eastern empire, and Pisans were brought into contact with eastern art. At the beginning of the eleventh century Pisa was the rival of Venice and Genoa as a great commercial and naval power, and took the lead in the wars against the infidels, defeating the Muslims in 1025, 1030 and 1089. The Pisans captured Palermo in 1062, and this further contact with Islamic and Byzantine art probably accounts for the characteristic Pisan use of striped marbles. The Pisans were defeated by the Genoese in 1284, and this was the beginning of their decline. The rise of Florence dates from 1125, when the inhabitants of Fiesole moved there when their city was destroyed, and in the following century Florence rivalled Pisa in commerce. Lucca, another important city during this period, was rent by the feuds of the Guelphs, supporters of the Popes, and the Ghibellines, who sided with the Emperors.

*North Italy*. In spite of the intervening Alps, commercial and cultural contact between northern Italy and northern Europe was very lively. The inroads made by the Goths into the north Italian plains during the fifth and sixth centuries led to the gradual rise of Venice. The indigenous traders planted their new colony on the islands of the lagoon; there, safe from serious attacks, they settled on a republican form of government, which afterwards became an oligarchy under the Doge, who was invested with supreme authority. Commerce and art were the special concerns of the Venetians. Their close alliance with Constantinople greatly increased their commerce, so that by the end of the eleventh century it extended along the Dalmatian and Istrian coasts to the Black Sea as well as the western Mediterranean.

*Southern Italy and Sicily*. In 827 the Muslims landed and gradually overran Sicily, which had been part of the Byzantine empire. The latter part of the tenth century was the most prosperous part of the Islamic period, after which bloody religious struggles ended the Muslim dynasty. From 1061 to 1090 the Normans, under Robert and Roger Guiscard, were engaged in the conquest of the island, and in 1130 a descendant of the latter was crowned at Palermo. During the succeeding years Sicily was again prosperous, as may be judged by the number and beauty of the buildings of this period, and her fleet was powerful enough to defeat the Arabs and the Greeks.

### *France*

France was part of the Carolingian Empire under Charlemagne (768–814) and Louis the Pious (814–40). Louis the Pious left it to his three sons, and the Treaty of Verdun (843) divided it into three kingdoms, with Charles the Bald as King of France. Subsequently, at the Treaty of Mersen (870), the Middle Kingdom was partitioned between France and Germany, the latter retaining the title of Roman Empire. That part of the Carolingian Empire which came to be known as France continued to be ruled by Carolingian kings until the death of Louis V, in 987. Hugh Capet was elected in his place, which broke the ties with the Empire and initiated the Capetian dynasty. The area bounded by Paris in the north and Orleans in the south (the 'Ile de France'), was the Royal Domain and the French kings' authority extended little beyond until the middle of the eleventh century, the greater part of France being held by the independent lords of Aquitaine, Auvergne, Provence, Anjou, Burgundy, Normandy and Brittany.

The eleventh century was marked by a widespread desire to withdraw from the world and embrace the monastic life; this resulted in the foundation of many religious houses (pp.171–3), which gave an impulse to architecture and also fostered art and learning. Religious zeal was not, however, confined within monastic walls, but was allied with secular ambition to produce the Crusades, which began in 1096 and were continued under Louis VII (1147). The crusading King Louis (1137–80), aided by Abbot Suger of S. Denis, also displayed his religious zeal through church-building. On the other hand, he weakened his kingdom by divorcing Eleanor of Aquitaine (1152), who then married Henry of Anjou, Henry II of England, thus giving the English king dominion over more than half of France. The country rallied again under Philip Augustus (1180–1223), who was strong enough to subdue the feudal lords and attack Henry II, and it was in his reign that a number of the first Gothic cathedrals were begun (see pp.387–407).

## *Central Europe*

Under the influence of Rome, Christianity took root in southern Germany and in the Rhineland, while the rest of the region remained pagan. As early as the sixth century the bishops of Trier and Cologne were conspicuous in promoting church-building. Charlemagne ruled over central Germany and northern France, and established Frankish dominion over southern France and northern Italy as well as becoming the first Holy Roman Emperor. He restored civilisation in great measure to western Europe, and was a patron of architecture.

Charlemagne died in 814, and after the death of his son and successor, Louis the Pious, the division of the Empire in 843 resulted in the establishment of an independent German kingdom. The German princes demanded the right to elect their own sovereign, and Conrad I (911–19) reigned as king of Germany. Henry the Fowler (919–36), the first member of the Ottonian dynasty to come to the throne, drove the Magyars out of Saxony and subjugated Bohemia and the tribes between the Elbe and the Oder to establish a united Germany. Otto the Great (936–73) was crowned king at Aachen. His wars, including his conquest of Lombardy (951), made him the greatest sovereign in Europe, and in 961 he received the Imperial crown at Rome.

When Conrad II became king of Germany in 1024, Denmark, under Cnut the Great, threatened his power in the north, and Poland and Hungary in the east, but he inaugurated the great Imperial age by restricting the power of both the secular and the ecclesiastical princes. Following wars between rival claimants, in 1138 Conrad III became the first of the Hohenstaufen dynasty, and was succeeded by Frederick Barbarossa (1152–90), who was also crowned Emperor at Rome. He defeated Denmark and Poland, secured an alliance with Hungary and negotiated with France and England. But his interference in papal schisms brought disaster until Emperor and Pope were reconciled under Gregory VIII. The Imperial cause was again asserted in Europe by the brilliant Frederick II (1218–50), who united in himself the crowns of the Holy Roman Empire, Germany, Sicily, Lombardy, Burgundy and Jerusalem. The political connection of the Hohenstaufen (or Swabian) Emperors (1138–1254) with Lombardy is demonstrated by the similarity of the architecture of the two countries during the later part of the period.

## *Spain and Portugal*

The Visigothic invasions of the fifth century across the Pyrenees displaced the northern tribes of Vandals and Suevi, and the Visigoths took nearly complete possession of the Iberian peninsula for three centuries until the Muslim conquest of all but Asturia in 711–18 (see Plate 3). The Muslim incursions in south-west Europe were checked by Charles Martel at Poitiers in 732, and subsequent Spanish mediaeval history is dominated by successive extensions of Christian influence and the regaining of territory until the very end of the fifteenth century.

Another outstanding feature of Spanish history during this period is the connection of Spain not only with France, her near neighbour, but also with England through royal marriages; with Italy through papal supervision and the quarrels with the Angevins in Naples and Sicily; and with the Moors from Africa. The Christian states of Castile, Léon, Navarre, Aragon and Portugal grew up simultaneously and gradually drove the Muslims into Andalusia. After many intermittent successes, the battle of Tolosa (1212) was the final turning-point in the decline of Muslim influence and also marks the introduction of Gothic architecture to Spain where it was most highly developed in Catalonia, immediately across the French frontier. James I (1213–76), King of Aragon, advanced in the east of Spain until the kingdom of Granada was the only portion left to the Muslims.

As to social conditions in Spain, only a small proportion of the population, including citizens of chartered towns, was free: under the system of land tenure the peasants were oppressed throughout the Middle Ages, a condition which produced the peasants' revolts of the fifteenth and sixteenth centuries. Society was dominated by the grandees and the clergy: churches and monasteries are the chief architectural monuments, while in domestic architecture there is little of importance except the houses of the nobility.

the posthumous spiritual needs of generation after generation. The integration of religion into the ordinary conduct of everyday life was total, and the result was a constant flow of funds into ecclesiastical architecture of one kind or another.

At the end of the Middle Ages, Europe was probably more ostentatiously devout than ever before, and religion was certainly no less institutional in the sense that it expressed itself in buildings and the furnishing of buildings. But the central preoccupation of religious observance was increasingly personal and private. It sprang from the individual's concern over his own destiny in the world to come. The exponents of these devotions emerged at all levels of society, and most of them were laymen rather than clerics.

At the highest political level secular rulers found it expedient to set good examples of proper Christian attitudes for their subjects. Already in the thirteenth century S. Louis of France had provided the model, and he also created fine displays of piety in the form of architecture. In the established monarchies of western Europe, royalty and the upper strata of the aristocracy founded chapels or added chapels to their palaces and castles. Rather belatedly the quality of Carthusian observance was recognised and it became fashionable for kings to found Charterhouses. On the eastern fringes of Europe, where enterprising rulers were in process of establishing new territorial and dynastic configurations, the Habsburgs in Vienna, Luxemburgers at Prague, and Casimir the Great of Poland provided their cities with great churches that could rival the cathedrals of the west.

In western Europe, the Hundred Years War (which ended in 1453) and the Black Death spanned a period of conflict and social change which left behind it the need for many kinds of new buildings, secular as well as ecclesiastical, as befitted a period of burgeoning urban expansion. Low down the social scale the burghers became acutely anxious about their spiritual prospects. Few were rich enough to found churches of their own, but collectively they invested heavily in their parish church and those of the mendicant orders, where they worshipped and in which they endowed chapels for soul-masses to be set against their sins in purgatory. Such churches are perhaps the most conspicuous surviving monuments of later Gothic.

They were built in proliferation in every city in Europe, from the Baltic to Tuscany, and from England and the Low Countries to the confines of Russia. Structurally they tended to be less ambitious than cathedrals, though on occasion in places as far apart as Venice, Lübeck and Barcelona (see, for example, S. Maria del Mar, Barcelona), they could rival or even exceed cathedrals in scale. What was really important about them was that they represented a continuous level of output which kept the architectural profession permanently at work.

But the churches, however prominent, present only one side of the picture. Although they remained the principal focus of patronage, late Gothic was the period in which architecture diversified its attentions and detached itself from exclusive dependence on ecclesiastical patronage. Secular commissions, which earlier in the Middle Ages had been confined to palaces and castles, now extended to a wide range of gentry and vernacular houses in the country, and houses for domestic, commercial and industrial purposes in towns (p.163C). Moreover the public buildings of city centres, and amenities such as colleges or hospitals endowed by public-spirited citizens, made demands upon the resources of design every bit as great in their own way as the efforts lavished on purely religious works. Although hardly any of them now survive intact—Venice is perhaps the most notable exception—complete towns as such were perhaps the most important achievements of the later Gothic builders (p.163B).

The wholesale process of secularising architecture no doubt prepared the way for the reception of the Renaissance; but the momentum was social rather than aesthetic. In the north especially it had proceeded a long way before there was any question of fundamental stylistic change. Nevertheless in adjusting themselves to the demands of urban and domestic building, Gothic architects were compelled to dissipate the original ecclesiastical character of the styles. There is not much about the merchant palaces of Venice or the burghers' houses of Rothenburg that deserves to be called Gothic, and to do so is not much more than a terminological convenience.

## Culture

### The Prehistoric Periods

**Throughout Europe, Paleolithic art appears to have taken three principal forms: portable sculptures of women and animals, paintings on the walls and ceiling of caves, and the decoration of artefacts with geometric designs.**

**Mesolithic tools were made for a wide range of purposes and art continued to develop. Representational art depicted everyday events such as food collecting, hunting, building and warfare. More abstract, stylised representations were produced in large numbers and Mesolithic engravings have also been found.**

**The first pottery, as with querns and axes of ground stone, was a Neolithic innovation. Different Neolithic peoples evolved highly distinctive pottery and decorative modes. Stone-built tombs for collective burial, ritual structures and massive earthworks became uses for architectural and artistic elaboration.**

The Bronze Age is characterised by the development of metallurgy, although artefacts were produced in a wide range of materials including pottery, glass, precious stones, bone, textiles and organic materials. New forms of burial resulting from the introduction of cremation lacked the elaborate architectural expression of the Neolithic age. The difference between rich and poor graves was marked by the extent to which the burial site was treated architecturally. Fewer elaborate ritual structures were built during this period; stone circles and standing stones were built in Atlantic Europe, and small temple-like buildings have been found throughout the remainder of the continent.

Late Iron Age societies developed a wide range of crafts. Pottery made on a wheel was produced professionally. Metalworking workshops of the kind used by the Etruscans, for example, evolved standard patterns throughout Europe. Carpentry, leather-working, textile production and wheelwrighting were also highly evolved. Art, particularly in the La Tène period, was used to decorate status items and personal ornaments with stylised naturalistic designs, curvilinear forms and crisp geometric patterns. In some parts of Europe, sculpture in wood and stone was also produced. Burial practices and religion ceased to be the focus of architectural expression, although both were still socially significant. Grave goods continued to indicate differences in social status, whilst cult sites such as henges, ritual shafts, cemeteries and sanctuaries were still built throughout the Iron Age. Perhaps the greatest cultural difference between the Celtic world and the worlds developing around the Mediterranean seaboard was that the former conserved oral traditions whilst the latter were rapidly becoming literate.

## The Etruscans

As Etruscan power grew, Etruscan society became more stratified and there was an expanding class of nobles. Their wealth depended more on the exploitation of deposits of copper, iron and silver than on animal husbandry and agriculture. With it, and under influence from Greece and further east, they embarked on the building of houses and temples of kinds not previously seen in Italy, as well as roads and other public works.

From primitive animist beginnings, their religion developed under Greek influence into belief in a broadly similar pantheon of gods. The feature which set it apart was a more fatalistic acceptance of the gods' will, which led to great emphasis on determining that will through divination (augury) and on placating it through sacrifices. The correct observance of ritual was held to be highly important, as was the correct following of prescriptions relating to the afterlife of the dead. The dead were buried in cemeteries well outside the cities, the more important in tombs which are now the main surviving monuments as well as the best evidence for the character of the houses of the living.

## Republican Rome and the Early Empire

Archaeology helps to confirm the picture given by Vergil and other Latin authors of the simple ways of life of the early Romans. They were essentially farmers, with few of the comforts that contacts with Greece had introduced into Etruscan society. They do not seem to have been deeply religious, but rather to have adopted the practices of others with whom they came into contact, including the Etruscans to whom they probably owed their rituals of divination and sacrifice. As a result their early sanctuaries and temples closely resembled those of the Etruscans. Each house also had its shrine to the family gods.

Early Roman society was strictly patriarchal but balanced by the honour paid to Vesta, goddess of the hearth, and by a strong sense of duty and a dislike of anything sybaritic. Not until the middle of the first century BC were permanent places of entertainment admitted into the capital, though they had long existed in the Campagna to the south. The focus of the city was the forum, the chief place of public assembly, not only for business and political discussion, but also for such entertainments and spectacles as were provided.

This way of life was altered in a number of ways as Rome's power expanded. An early consequence of the Punic wars was a marked change in the pattern of settlement of the countryside outside the city. Small independent landowners were replaced by newly-rich landlords whose big estates were run by hired labourers and slaves. In the capital itself the population was swollen by influxes of non-Romans including war captives, slaves, and dispossessed small farmers. To accommodate them, new forms of high-density housing and other major public works were called for. Their arrival and close contacts with numerous different cultures led also to other changes —from the import of new religious cults and practices to the adoption of many aspects of Hellenistic life and art. At the same time, the change in the pattern of government set in train by Augustus led to an unbridgable gulf between a minority of full citizens and a large urban proletariat with few, if any, rights. To keep this proletariat reasonably happy, a policy of providing free corn and free entertainments—bread and circuses—was adopted. Specifically Roman forms of entertainment were the chariot races that took place in the circus (see p.228) and gladiatorial combats which had their origin in funeral rites involv-

## *The British Isles*

Christianity first made its way into Britain during the Roman occupation, but during the years of the Anglo-Saxon settlements, after the middle of the fifth century, church building was of historical importance only in Ireland. S. Alban, the first British martyr, died in 305, and in 314 the bishops of York, London and Lincoln are recorded as attending the Council of Arles, but religious influences upon building in Britain were very small until S. Augustine landed in England in 597, converted the Kentish King Ethelbert and other kings of the Saxon Heptarchy, and introduced the Benedictine order to Britain. The Seven Kingdoms were based upon the migration of Jutes into Kent, Saxons into Sussex, Wessex and Essex, and of Angles into Mercia, East Anglia and Northumbria. The conversion to Christianity of the Anglo-Saxon kings and their people is evidenced by numerous surviving churches, towers and crosses of the seventh and eighth centuries.

The post-Heptarchy period, after the Danish invasions of the ninth century and the unification of the different kingdoms behind one leader, King Athelstan (927), until the Norman conquest, was characterised by Benedictine reform and by the monastic revival of the late tenth century. The principal supporters of this movement were King Edgar (959–75), S. Dunstan, who became Abbot of Glastonbury in 960, and Ethelwold, Bishop of Winchester in 963.

In 1042, Edward, son of the English King Ethelred, acceded to the throne. Norman by association and education, he consolidated the kingdom and, largely by the introduction of Norman favourites into the Court and the Church, assured Norman influence on England before the Conquest. He appointed Robert, Abbot of Jumièges, as Archbishop of Canterbury in 1051, and meanwhile had begun about 1050 the construction of Westminster Abbey which had been planned in the current Norman fashion.

The Conquest of 1066 linked England to Europe and introduced a fully developed feudal system. Yet all land was held from the king, who established the most efficient and centralised government in Europe.

Just over a century later, William of Sens was rebuilding the choir at Canterbury and the transition from Romanesque to Gothic had begun in earnest.

The influx of religious orders from the continent in the first half of the thirteenth century resulted in the building of many spacious new churches, while internal strife around the turn of the thirteenth and fourteenth centuries encouraged development of the architecture of fortifications and castles.

## *Scandinavia*

Social history in Scandinavia in the early centuries of this era is obscure, but it is evident that kingdoms were established first in Denmark and Norway, and that by about the year 1000 Sweden was united to form part of the Svear Kingdom. The Viking expansion of the ninth century, which included the early Danish settlement in eastern England, the colonisation of Normandy and the establishment of Svear colonies in Latvia, all brought northern influences to bear upon European development.

The most distinctive building development of the period in Scandinavia followed the conversion of the northern races, which was started by the Frankish missionary Angar at Hedeby in Denmark in 826, but not completed until the end of the twelfth century. Some north German influences, encouraged by trade, can be traced, but the Norse Church itself was established from Britain, and Christianity was legally established in Norway, Greenland and Iceland by the end of the tenth century. In 980 the Danish King Harold made his people Christians, English bishops were introduced, and during the following century Cnut and his successors spread their empire to England. In 1030 the Norwegian Christian King Olav Haraldsson was killed in battle, and was later canonised. The Cathedral at Trondheim was built as his reliquary. During the eleventh century Christian centres were established successively further north in Sweden, at Lund, Skara and Sigtuna, and in 1130 a diocese was established at Gamla (Old) Uppsala, after the destruction of the pagan temple there at the beginning of the century.

The pattern of mediaeval history in Scandinavia was largely determined by the continuing conflict between Denmark and Sweden. Danish solidarity was early reduced by revolt among the peasants and by conflicts between feudal landowners. By the middle of the thirteenth century the Hanseatic League of north German cities was able to intrude along the Baltic shores, and even on the Atlantic seaboard of Norway. In the southern Baltic the merchant interests of the Hansa were widespread, while the feudal administration of farming depended, particularly in Sweden, upon the alliance between the Crown and the feudal lords. The wars between the Danes against their neighbours and the League led to concessions of substantial land interests to German nobles. The resulting dispersion of aristocratic wealth reduced the opportunities for display in domestic or military architecture compared with other parts of northern Europe.

## *The Holy Land*

The Latin Kingdom in the Holy Land was established as a direct consequence of the First Crusade undertaken by Christian Europe following the call by Pope Urban II in 1095. Earlier efforts had resulted in premature and ill-organised expeditions which met with great losses, but the response to Urban's call produced a force of 150,000 which forgathered in Constantinople in 1097. Later that year some of them passed through the Cilician Gates, the principal pass in the Taurus range, but when Jerusalem fell in 1099 the Crusader force probably numbered little more than one-tenth of those who had left Constantinople two years earlier. By about 1115, towards the end of the reign of Baldwin I, the Latin Kingdom was fully established, but, in spite of continuous reinforcement from Europe, it suffered from a persistent dearth of armed power, and the tendency everywhere was to replace soldiers with fortifications.

When Muslim forces were assembled under the united command of Zengi and Nur-ed-Din, the menace came not from the cities on the fringe of the eastern desert but from Mesopotamia. The loss of Edessa in 1144 was serious because it deprived the kingdom of both corn produce and auxiliary manpower drawn from the Armenian Christian community. The Second Crusade of 1148 was ineffective in compensating for this loss. Saladin's victory at Hattin in 1187 so drastically reduced the strength of the Crusaders in the Holy Land that it never recovered. Although Richard I took Jaffa, Acre and Ascalon in 1191 and 1192, and although Crusader defences were further strengthened and their fortunes varied throughout the ensuing century, the eventual outcome was inevitable: in 1292 the last of the Latins in the Holy Land sailed away from Chastel Pélérin to Cyprus.

## The Gothic Period

The political and historical background in France, where the Gothic style originated in the Ile de France, is still significant. Capetian suzerainty of the great counties of France was strengthened and extended from time to time by marriage, as when Louis VIII married Eleanor, the heiress of Aquitaine; but equally, marriage alliances between the great vassals could bring dangerously threatening power blocks into being. The alliance of the houses of Blois and Champagne very nearly eclipsed the Capetians, but their greatest challenge emerged when Henry Plantagenet inherited Anjou from his father, Normandy from his mother, and married Eleanor of Aquitaine, recently divorced by Louis VIII, thus within a few years uniting the entire western seaboard of France, from the Channel to the Pyrenees, under one rule. Besides, Henry was also King of England, so that although the Capetians could claim suzerainty over his lands in France, they had no real advantage of rank.

The so-called Angevin Empire was too big to be really controllable, and liable to fragment into its constituent parts at any moment. But it was rich, and in those areas—England and Normandy—where Angevin control was tightest, administration and government had already, by the second half of the twelfth century, reached levels of efficiency far beyond the primitive and often ineffectual attempt to keep the peace that passed for government in the Capetian domains. Nevertheless, it was in effect the Plantagenet threat that galvanised the Capetians to set their own house in order, and to impose their own relatively centralised rule on the various French provinces.

A series of remarkable personalities guided the fortunes of the Capetians for the best part of a century. Philip Augustus (1180–1223), cautious, tenacious, very astute, was the real architect of Capetian success. He broke the Angevin stranglehold on western France, conquering Normandy and the English possessions apart from Aquitaine in 1204. In 1214, he defeated the Germans, English and Flemish at Bouvines, bringing the rich and well organised county of Flanders under direct Capetian control. He allowed his son, the shortlived Louis VIII, to extend French royal power into the south of France—the very different Languedoc, with its separate language, troubadour culture and mores—on the pretext of a Crusade against the Albigensian religious sect, which had taken hold in the south, and had recently been declared heretic. At the same time, Philip ensured that French administration absorbed many of the advances of his Anglo-Norman rivals. His grandson, Louis IX, continued the trend toward more efficient and centralised government, but also acquired sufficient reputation as a good, just and pious king to be canonised in 1297.

Even by the twelfth century the Church had largely made good its claim to pre-eminence among the institutions of European society, and was prepared to call new tunes in matters of art and architecture. Essentially these were revised in the interest of ecclesiastical propaganda. Church architecture was progressively purified. A large part of the Church's finances was invested in new buildings, and this was augmented from secular sources in the form of benefactions and bequests. In addition to existing cathedrals and abbeys which were recurrently in need of repair and restoration, the spate of new foundations continued unabated until well into the thirteenth century, and although it subsequently slackened, it never really dried up until the end of the Middle Ages. The Cistercians, the regular Canons, and the orders of friars spread into the remote corners of the continent, and wherever they went they built abbeys, priories and convents. There was at least one parish church in every village and in the major towns sometimes ten or more. Every organisation, secular as well as ecclesiastical, had its own religious life which required a chapel, or access to some part of a church, for corporate worship. Every family of consequence had its private chapel, and from royalty down through the ranks of the nobility to the parvenus of commerce it was a recognised practice to found or to adopt religious institutions in the vicinity of their homes to safeguard

4) The Cistercian Order ('White Monks'), founded in 1098 at Cîteaux, and shortly afterwards at Clairvaux. After 1134 all Cistercian churches were dedicated to the Virgin and had no separate Lady Chapel. The ascetic aims of the Cistercian Order produced an architecture which was at first simple and severe.

5) Secular Canons, serving principally cathedral and collegiate churches. They lived according to the rule of S. Chrodegang of about 750.

6) Augustinian Canons ('Black Canons regular'), established in about 1050. They undertook both monastic and pastoral duties in houses often sited in towns, and planned similarly to those of the Benedictine Order.

7) Premonstratensian Canons ('White Canons regular'), founded in 1120 by S. Norbert at Prémontré in northern France.

8) Gilbertine Canons, an exclusively English order, founded in 1131 by S. Gilbert of Sempringham, which usually combined a house of canons under the Augustinian rule with another of nuns under the Cistercian rule, in conventional buildings attached to a common church divided axially by a wall.

9) The Knights Templar, founded in 1119 to protect the Holy Places in Palestine and to safeguard the pilgrim routes to Jerusalem. Templars' churches were modelled upon the Church of the Holy Sepulchre in Jerusalem.

10) The Knights Hospitallers, organised in about 1113 (the Knights of S. John of Jerusalem) under Augustinian rule. The order eventually held a great deal of property in Europe, but developed no characteristic architecture of its own.

11) The mendicant orders of friars, founded during the thirteenth century and headed by the Franciscans and the Dominicans. The functions of friary churches with an emphasis on preaching were sufficiently distinctive to demand planning of a characteristic kind, but they developed when Gothic architecture was already succeeding Romanesque throughout most of Europe. Their houses were usually sited in towns, where the friars preached and did charitable works among the common people. Some also played an important part in the rising universities throughout Europe.

Nothing is more expressive of the developing power of the holy orders and of culture in Romanesque Europe than the planning and building of monasteries. Typically, the developed monastery plan of the Middle Ages consisted of a square or rectangular cloister to the south of the abbey church, the projecting transept arm determining its eastern boundary. The cloister, open to the sky, had a covered walkway on each of its four sides supported on one side by arcades and on the other by the walls of the most important conventual buildings. To the east side of the cloister and to the south of the transept arm lay the chapter house where formal meetings were held to make decisions on the running of the community. Further south lay the dormitory at first floor level above an undercroft. To the south side of the cloister was the 'frater' or refectory and the kitchen. The frater often incorporated a pulpit from which readings were made during meal times. The west range contained the abbot's lodgings, guest rooms and a cellar for the storage of food. The other buildings of the monastery such as the infirmary, the brewhouse, the bakehouse, stables and farm buildings were arranged according to the limitations of the site. Fresh water was readily available with provision for washing in the cloister.

The abbey church itself was divided into two, the eastern parts reserved for the monks, the nave usually open to lay people. The partition or screen was normally situated two or three bays west of the crossing. It contained a pulpit and immediately to the west of it was placed the nave altar. The monks' stalls were immediately to the east and ran beneath the crossing. The high altar was situated in the main apse and there were various subsidiary chapels in the aisles, transepts and galleries. All the buildings of the monastery were contained within a walled precinct with gatehouses. Except for the absence of a chapter house, which became an essential element during the eleventh century, the ideal plan of S. Gallen (Switzerland) prepared early in the ninth century provided a model layout for the arrangement described above (p.172).

Not all monasteries adhered rigidly to this plan, however, and the particular requirements of some orders necessitated differences. This is especially important in the case of the Cistercian Order, which had to provide quarters for large numbers of lay brethren (*conversi*) who were required to run the monastic estates according to the Cistercian practice of direct management. They were housed in the west range with a separate frater and worshipped in the nave of the church separated from the monks' choir. In England, cathedrals were often run by Benedictine monasteries in conjunction with the bishop. In all other European countries, cathedrals were under the jurisdiction of the bishop and his own community of secular canons; monasteries were not under episcopal control and, indeed, were often critical of the bishop.

## *The Pilgrimage Churches*

Pilgrimages were a much-practised form of religious devotion during the Middle Ages. Christian fervour inspired thousands to travel to the innumerable shrines and holy places throughout Europe and the Near East. The shrine of S. James (Santiago) at Compostela in the north-west of Spain was a principal centre of pilgrimage which attracted pilgrims from ing human sacrifices for the future wellbeing of the dead. The profligate tastes of some of the successors to Augustus—himself a frugal man of simple tastes—and a new ostentatious display of the power of the empire, and the majesty of the emperor, completed the transformation. Linked with the last was the practice of deifying emperors after their deaths and erecting new temples in their honour.

## The Later Roman Empire

Generalisation about the later empire is less easy because its territory was so widespread. The situation differed greatly between those provinces where the indigenous culture was less advanced than Rome's and those where it was initially at a higher level. As the new masters, Romans preferred to leave their subjects to conduct their affairs in their own way, subject only to certain obligations and to the oversight of a provincial governor. Thus, for instance, local religious practices were allowed to continue if they posed no apparent threat to Rome, and large new temples might even be erected to local gods. The same policy resulted in the import of new religions into Rome itself with the movements of armies, traders, captives, and slaves. Even the imperial throne was eventually occupied by non-Romans.

In so far as there was a consistent official attitude to religion, it was dualist in character. Something had survived of the fatalistic Etruscan belief that the future of the empire was ultimately in the hands of the gods and must be safeguarded by the proper observances which were in the hands of the priests, and successive emperors lavished money on building new temples to the gods of their choice. Personal wellbeing was the concern only of the individual so long as there was no conflict with the interest of the state. Thus the way was open for the spread and growth of other religions, notably those from the more monotheistic east. Of these, the worship of the sun became the most important in the third century, and was officially adopted by some emperors and paved the way for the later acceptance of Christianity by Constantine. Christianity spread chiefly among the underprivileged in those commercial centres visited by Jewish traders, but by the early second century its adherents were to be found in most strata of society, and by the third century they had become numerous enough to be regarded as a serious threat on several occasions. This led to ineffectual persecutions by Decius (249–51), Valerius (257–61), and Diocletian.

The significance of Constantine's conversion to Christianity stemmed from the fact that he saw the Christian god as a new protector of the state. Architecturally, this resulted in a vast new programme of church building, though pagan worship was not outlawed until 391.

A secular institution, the public baths, calls for some comment at this point. Its origins can be traced back to Republican times, and the first such bath in Rome itself had been built by Agrippa in the time of Augustus and was probably modelled on earlier baths built elsewhere, for example at Pompeii, Herculaneum and Baia. It is to the later empire, however, that the great surviving baths belong—usually known as thermae to distinguish them from the smaller earlier balneae. They were much more than the name now suggests. They embodied the Greek idea of the gymnasium, and were not only places for luxurious bathing but also for social intercourse and recreation in many different ways—intellectual as well as physical.

## Constantine and the Byzantine Empire

The continuity of the Byzantine empire with the earlier Roman empire in the east has already been stressed—as indeed it was by the Byzantines themselves. But the continuity did not preclude change in the pattern of life—nor even in the nature of the new official religion that lay at its heart—as the empire itself changed.

At least until the end of the sixth century, life in Constantinople and in the other cities of the Byzantine empire followed a similar pattern to that of Rome, with much the same institutions. The differences were differences of degree. The bloody contests associated with the amphitheatre had never been important in the East. The forum had become less a place of public assembly because the general public no longer played any part in government. The public baths were still important, and chariot races in the hippodrome became the chief public entertainment, with semi-official factions supporting the principal teams. In Constantinople the emperor presided over them, as he had done in Old Rome, and a dole of corn continued the earlier Roman practice.

A consuming interest in the finer points of religious doctrine probably stemmed partly from a more philosophical eastern approach aiming to define the indefinable, partly from a conviction that it was supremely important to get things right, and partly from the fact that religion provided an outlet for the expression of ideas that might have been expressed in more openly political terms in a freer society. Doctrinal differences had begun to arise as soon as the early Christian converts from the more intellectual strata of society sought to define their beliefs.

These differences mostly centred on the nature of Christ and his relation to God. In 325 Arianism, which had its source in Alexandria and which held Christ to be purely human, was condemned as a heresy by a Council summoned by Constantine in Nicea. Yet, in Italy, it was still a powerful counterforce to the accepted doctrine two centuries later, because of its adoption by the Gothic emperors who ruled in Ravenna. In the East, by this time, however, the chief difference was over the single or dual nature of Christ. Those who held the first view (the monophysites) were in the majority in Syria and Egypt, while the second view was the official orthodoxy in Constantinople. The difference led to persecutions of the monophysites fully comparable with the earlier persecutions of the Christian church by pagan emperors, and to alienation of the peoples in these regions that must have contributed substantially to the later rapid Arab conquests.

In the eighth century another heated controversy arose over the admission of representations (icons) of divine persons in church buildings. Leo III (717–41) forbade them, and this iconclastic view prevailed until 843, when the icons were restored—though the only representations allowed were those on a flat surface in paint or mosaic. They were never sculptural as their counterparts often were in the west.

There were parallel changes in practice which affected the detailed planning of churches. They are less important architecturally than the virtual end of church building in lands conquered by the Arabs, and less important also than the general decline in the fortunes of the empire from the early seventh century, which meant that virtually all later building was on a much reduced scale. Even the city as it had existed from Classical times was in sharp decline—a decline that was reversed only to a limited extent in the eleventh century. There was little new secular building to indicate the architectural changes related to Seljuk and Ottoman influence, such as those parallel changes in, for example, dress.

## Romanesque Culture

For hundreds of years after the collapse of the Roman empire, Europe to the west of the Elbe remained unimportant politically and culturally by comparison with the eastern empire of Byzantium. Architecture atrophied along with Europe's effective political unity and its basis of territorial power. Its eventual isolation, cut off from Constantinople by intervening Bulgars in the east and under threat from Islam to the south and south-west, meant that the foundations of a continental culture had to be laid in a context of confusion and conflict. When the cultural evolution restarted, it is not surprising, therefore, that there was, for example, evidence of Islamic influence in the mode of the further evolution of Italian Byzantine models. Whilst the influence of the Byzantine church itself continued in parallel elsewhere (see Part 3), ensuring the extension of the style well past the middle of the second millennium, in Europe the Romanesque style, with its roots in the Roman basilica plan, was also evolving and would quickly be transformed into the Gothic of western and northern Europe.

Christianity and the influence of the religious orders, and with them education and culture, were spreading. The effects were secular as well as ecclesiastical, because often the erection of a church or monastery was the signal for the foundation of a town—further evidence, if such were needed, of the burgeoning power of the Church which rivalled or controlled such civil government as existed. By reason of their feudal possessions, bishops and abbots were also military chiefs who sometimes took the field in person. Everywhere the power and prestige of the Church increased. Religious enthusiasm and zeal found their material expression in the magnificent cathedral churches and monastic buildings, which were an even more significant outcome of this period than were the castles of feudal chiefs.

This same religious fervour led to the Crusades against Muslim occupation of Palestine and the Holy Places, and this intermittent warfare (1096–1291) between Christians of the west and Muslims of the east was not without its effect on western art. Monastic communities had existed since the fourth century, and by 800 the spread of Benedictine houses was being promoted by Charlemagne and other rulers. The eleventh century proved especially remarkable for the development of the monastic system, which encouraged new methods in agriculture and exercised its influence on architecture; indeed, until the end of the Middle Ages science, letters, art and culture were largely the monopoly of the religious orders. The schools attached to monasteries trained young men for the service of religion; monks and their pupils were often the designers of churches.

The principal religious orders were:

1) The Benedictine Order, founded early in the sixth century at Montecassino in southern Italy by S. Benedict of Nursia. Possessions were held in common, but the absence of particular vows of poverty facilitated charitable works and agrarian enterprise. Benedictine houses were commonly sited in towns, part of the church being devoted to offices for the laity.
2) The Cluniac Order, which also followed the rule of S. Benedict, founded by Abbot Odo in 910 at Cluny in Burgundy. By the twelfth century the abbey of Cluny was one of the most powerful institutions in Europe.
3) The Carthusian Order, founded by S. Bruno at the Grande Chartreuse near Grenoble in 1086, returned to eremitic and ascetic principles, which had elsewhere been relaxed. The order was recognised only in 1142. The Charterhouses, often remotely sited, provided separate cells for the monks, generally grouped around a cloister garth, and the community served a simply-planned church; Carthusian architecture is notably severe and unadorned.

vaulted hall on top of another. It was done very effectively at the Albrechtsburg at Meissen and the Hradčany at Prague. But it was costly, inconvenient, and difficult to adapt. As soon as the conduct of affairs required uncluttered rooms, served by long corridors and imposing staircases, the days of Gothic were numbered. Conversely, the style attracted a lot of sympathetic attention in the nineteenth century when structural engineers were called upon to produce large sheds for railway stations.

There are no contemporary accounts which provide incontrovertible evidence that churches were thought to have specific meanings. On the other hand imagery was rife, and the development of Gothic architecture went hand in hand with the development of Gothic sculpture, stained glass and painting, which provided the churches with a plentiful quota of permanent spiritual residents. Their presence leads naturally to notions of cathedrals as comprehensive symbols of the Heavenly Jerusalem or the Church Triumphant. In a strictly functional sense a cathedral was a collection of altars, each dedicated to its own saint whose title was represented by his relics, and for the sake of whose intercessions the endless, liturgical round was performed. By an easy extension the church itself could be regarded as a kind of monumental reliquary. Loosely, all these iconographical themes come together as research into shapes and spaces likely to induce attitudes of reverence and a lively sense of holiness.

It is not necessary to suppose that such ideas were indispensable, or that they were applied in rigid, literal ways. But whether they were taken seriously or not, they help to correct the impression put about by influential interpreters like Viollet-le-Duc to the effect that Gothic was nothing more than structural engineering. However important and distinctive the engineering it was always liable to be at the service of religious and aesthetic considerations. It was never an end in itself. Even at its most sensational, for example in the prodigy towns and spires of late Gothic, the aim was to project something visually exotic and obsessive on town and countryside for miles around. Nevertheless it remains indisputable that none of the brilliant effects of Gothic would have been possible without the high level of professional competence achieved by its craftsmen.

# Resources

## Prehistoric Periods

**The advance and retreat of the ice-sheets throughout the Paleolithic period left little surviving evidence except in caves and rock-shelters. Moreover, the resources available to Paleolithic builders were limited.** In western Europe, surface materials such as timber, brushwood, stones and the hides and bones of animals were collected and assembled into dwellings. A more abundant and spectacular architecture was found in the rigorous periglacial steppe regions of eastern Europe where, throughout the Paleolithic ice age, hunters systematically collected mammoth bones to build shelters.

Resources do not appear to have been systematically exploited during the Mesolithic period, but the Neolithic was notable for the development of mining. Igneous rocks and flint were actively exploited and raw materials were exchanged over long distances. Trees were felled and processed. Housing was mainly built from local materials, but the erection of monuments involved the use of non-local materials. A major resource during the Neolithic period was manpower. Major monuments are estimated to have taken many millions of man-hours of work and such practices appear to have continued into the Bronze Age, but with a steady increase in the availability of materials and products from distant locations.

In the Iron Age, a wide range of natural products was exploited. Ores were obtained by surface grubbing and deep shaft mining. Both iron-smelting and the construction of large-scale defences required the wholesale clearance of high-quality timber. Building materials were often transported over considerable distances.

## Etruscan and Early Roman

Central Italy was less well endowed with the excellent readily available marbles that were exploited to such good effect by Greek architects. Local stone was used where strength and durability were important, as in some of the later defence walls and in temple platforms and tombs—though the latter were often cut directly out of the rock if it could be cut easily. There were, however, good brick earths. Until quite a late date, unfired mud brick or rammed earth was the usual alternative to wattle and daub for walls, fired terracotta being used only for roofing tiles and in other positions where durability was important or fine decorative detail was desired. Good timber was also readily available and was used for posts and beams and other roofing members.

## Later Republican and Early Imperial Rome and Italy

**The most significant changes in the materials accessible to the architect in later republican and early imperial Rome and Italy were the introduction of fired brick, great improvements in the quality of**

mortar brought about by adding natural pozzolanas (volcanic earths) to the lime and sand, and the import of foreign marbles coupled with the first large-scale exploitation of Carrara marble.

More extensive use was also made of locally available stones. In the neighbourhood of Rome these included tufa, a porous volcanic stone of varying degrees of hardness; travertine, a fine hard limestone from near Tivoli; and peperino, a stone of volcanic origin from the Alban Hills. None of these was of the quality and strength of Greek marbles. The bricks were, from the beginning, tile-shaped—those known as bipedales being about 40 mm (less than 2 inches) thick and having face dimensions of almost 600 mm (2 Roman feet) square. Their production was soon highly organised and standardised, as, at a somewhat later date, was that of marble columns and other marble elements.

Equally significant were the financial resources that came from the booty of foreign conquests. Victorious generals sponsored new public buildings and other public works, and Augustus himself set the pattern for later emperors by sponsoring new construction on an even larger scale. Wealthy individuals undertook both private and public commissions. Contacts with the Classical world of Greece and the Hellenistic east permitted the import of architectural skills, to which Vitruvius bears witness even while adopting a conservative pose and arguing for the maintenance of older native traditions. To undertake the vast building programmes, it is obvious that there were large bodies of both skilled and unskilled craftsmen. From the later first century AD we have some record of their organisation and their division into numerous specialised crafts, membership of which tended to become hereditary. It is also important to note that the almost universal adoption of brick-faced concrete by this time greatly reduced the need for skilled workers as compared with unskilled.

## The Wider Roman Empire

In the provinces outside Italy there were, initially at least, great differences between one place and another. In those provinces where Rome took over long-established earlier Hellenistic kingdoms, the change in administration brought about no great change in the materials available. In much of the east and of North Africa, for instance, dressed stone continued to be the usual material for buildings of any importance. Fired brick was, however, introduced for walls and vaults where good stone was less plentiful and mud brick had been used previously. Mortars with similar properties to those made from natural Italian pozzolanas were made by adding crushed underfired brick to the mix. On the other hand, in the provinces north of the Alps where there was no comparable earlier tradition of building, new materials began to be used. Wherever possible these materials were of local origin in order to eliminate the high costs of transport. The most important from about the first century AD were those that could be employed to make variants of Roman brick-faced concrete.

The necessary skills in design and construction were already available in those provinces where well-developed building traditions existed and continued to evolve. If Roman rule made any difference here, it was probably in facilitating the movement of architects and the more highly skilled craftsmen from place to place, with a tendency for the best to be selected for imperial service—men like Trajan's principal architect, Apollodorus of Damascus. Elsewhere the necessary skills must initially have been imported; small cadres of skilled men were brought in to direct unskilled local labour.

Sponsorship followed a similar pattern to that already referred to in later republican and early imperial Rome, though on a varying scale according to local wealth and importance. Some major building programmes were undertaken in the home countries of non-Italian emperors like Septimius Severus; others, later, in places like Trier when they became imperial residences. One of the more surprising features of later imperial architecture is the scale of some of the works undertaken, especially in Rome, when the empire was already in decline and subject to severe economic problems. There are, however, indications of straitened circumstances in the growing reuse of materials—including highly worked masonry such as columns, capitals and decorated friezes—taken from earlier buildings.

### *The Early Christian Period and the Byzantine Empire*

With the increasing Christianisation of the empire during the fourth century, patronage passed more and more to the Church, which soon acquired large holdings of land and other wealth by gifts.

Indications of straitened circumstances can nevertheless be seen in the even more widespread use of salvaged marble columns, for instance in the large number of new churches built soon after Constantine's adoption of Christianity, and in edicts of 334 and 337 seeking to made good shortages of skilled architects and craftsmen. Other evidence from this time emphasises again the mobility of such men and shows that plans for new buildings might be sent from one place to another when suitable local architects were not available. To set alongside Vitruvius's optimistic description of the ideal polymath architect in the first century BC, we have, on the other hand, a more factual description by Pappus of Alexandria of architectural training in the early fourth century. This as far afield as Britain and Germany. Churches and monasteries en route were able to make considerable material gain from providing accommodation and facilities to worship. The wealth generated along the pilgrimage routes during the eleventh and twelfth centuries enabled religious communities to build vast new churches. Masons and sculptors were in constant demand and, understandably, frequented these routes and spread the new Romanesque style along the routes to Compostela from the 'Ile de France'.

The main pilgrimage churches are S. Martin at Tours (begun after 997, largely demolished at the time of the French Revolution), S. Foi at Conques (*c.* 1050–*c.* 1130), S. Sernin at Toulouse (1077–1119) and Santiago de Compostela (1078–1122). The churches share a mature Romanesque style, with ambulatories, compound piers and triforium galleries—all the principal Romanesque characteristics. A school of architectural sculpture covering south-west France and northern Spain evolved in connection with the design and construction of the pilgrimage churches.

## *Italy*

*Central Italy*. The growth of an industrial population, the increase of commerce and the rise of powerful ruling families promoted the foundation of independent and fortified cities, such as Pisa, Lucca and Pistoia, all rivals in architectural achievements. The effects of internecine feuds between these city-states can be seen in architectural features such as the battlements of castles and fortifications. The artistic activity of Tuscany in the eleventh century showed itself chiefly in architecture, which in turn provided a setting for the arts of painting and sculpture.

*North Italy*. As a result of the alliance of Venice with Constantinople, precious freights were brought from the East to glorify Venetian buildings. Thus did the East triumph in the West through its influence on the buildings of the Queen of the Adriatic. The free cities of north Italy, such as Milan, Pavia, Verona and Genoa, vied with one another in the beauty of their public buildings, and this spirit of rivalry encouraged the most remarkable structural advances in all Italy.

*Southern Italy and Sicily*. Under Islamic rule in Sicily, even church facades were ornamented with geometrical patterns, because the Muslim religion forbade the representation of the human figure. The Muslim and earlier Byzantine influence persisted even after the Norman conquest of the region in 1061. The traditional use of mosaic in decoration was fostered by the Norman kings, who established a school of mosaic at Palermo. Southern Italy, which always maintained a close connection with Sicily, largely avoided Islamic influence, retaining close contact with the eastern empire.

## *France*

Many of the major religious orders—for example the Cluniacs, the Carthusians, and Cistercians—were founded in France (see p.171). The French played a leading role in the Crusades and in the formation and government of the eastern Latin empire until its decline and final disappearance at the end of the thirteenth century. The culture of northern Europe was much influenced by the regional Romanesque art and architecture of France. The high reputation of the University of Paris, which originated in the cathedral schools, attracted influential teachers during the twelfth century and was widely recognised. Though intellectually distinguished, mediaeval France did not form a coherent cultural unit in any sense: different art forms, sculpture and poetry, for example, as well as architecture, only gradually grew together under the Capetian kings to produce the French tradition as it is now understood. In literature as in architecture, the dominant themes were feudal loyalty and Christian faith, closely related as they were to the mystic ideal of the knight dedicated to the service of Christ.

The Romanesque style was developed to the point of near perfection in the structural articulation and architectural sculptures of Vézelay, Arles and Angoulême. The imposing recessed west doorways with sculptured tympana were the forerunners of the magnificent sculptured doorways of the Gothic period.

## *Spain and Portugal*

Spain's many links with neighbouring countries, with England and with Italy, all affected in varying degrees the architecture of the Iberian peninsula. The evidence of Islamic influence appears in curious construction and exuberant detail and occurs quite often even in the Christian north, owing to the demand there for Muslim craftsmen with their superior ability. Muslim features were most evident in the churches of the Mozarabs—Christians who were tolerated in areas under Muslim control.

As a result of the exultation over the conquest of the Muslims at Tolosa in 1212, Christian art achieved a great impetus, aided by the plunder taken from the enemy.

Christianity reached the Iberian peninsula in the second century and flourished for most of the following two hundred years. The constant warfare, which was religious more than racial, gave a certain unity to the Christian states of the peninsula. Throughout the mediaeval period the Church was the strongest and most constant unifying force in the struggle against the Muslims, and as a result it obtained great temporal power and possessions. This fact, and the Spanish taste for dramatic ceremonial and ritual, determined the planning of the cathedrals and churches with their great sanctuaries and enormous chapels for the noble families. The Muslim religion forbade the human figure in sculpture and decorations, and encouraged geometrical ornament. The result of this ordinance is seen in the richness and intricacy of surface decoration even in Christian churches, on which craftsmen trained in Islamic traditions were often employed.

### *The British Isles*

The main effects of monastic reform in the tenth century were to introduce the features of continental building, which had been briefly foreshadowed in Britain only in the northern work of the school of S. Wilfrid of York and in seventh-century Kent.

After the advent of William of Normandy, castles were built to strengthen the position of the conquerors. Towns, which grew up around abbeys and castles, became trading centres, and through their merchant guilds laid the foundations of urban government. Villages continued as mere collections of rudimentary dwellings. Settled government prompted the pursuit of learning, based in the twelfth and thirteenth centuries upon monastic schools and upon the two English universities. French was the language commonly used in court circles until the thirteenth century.

The First Crusade was preached in 1096 by Pope Urban II and Peter the Hermit. The later Crusades induced an exchange of ideas between East and West, and involved England in international movements. Richard I, son of Eleanor of Aquitaine and Henry II, after his experience of the Third Crusade, established a pattern of military architecture in his building of Château-Gaillard at Les Andelys in Normandy. The Crusades gave impetus to the progress of learning and in the foundation (1113–18) of the military orders which influenced some aspects of church-building later in the Middle Ages. In 1128 the Cistercians built their first English house at Waverley in Surrey, and in 1175 William of Sens began the rebuilding of Canterbury Cathedral choir in the new Gothic style.

### *Scandinavia*

The monastic orders played an important part in reinforcing Scandinavian links with Europe. The Benedictine church architecture of Denmark and Norway followed very closely the custom of the order; several Cistercian abbeys were established in Denmark and Sweden, displaying the simple and robust characteristics of Burgundy, and plan forms derived from both Fontenay and Pontigny. Smaller churches in mediaeval Scandinavia, even as late as the fourteenth century, were built in simple Romanesque form. In more remote and secluded areas fashions in building were usually those of an earlier period. In Finland, for instance, the expansion of Swedish power in the eastern Baltic promoted church-building in stone after the beginning of the thirteenth century, but the stylistic characteristics which persisted were predominantly Romanesque.

### *The Holy Land*

The Frankish fighting men were in a minority even in their own garrisons in the Holy Land, and some of the characteristics of the magnificent military architecture resulted as much from the need for security against internal revolt as against external threat. The continuation of the Holy War throughout the twelfth century produced buildings that were not only of immediate military value but were to have a wide influence upon later castle architecture in Europe.

It is worth emphasising that the building initiative of the Crusades was turned to the necessary religious functions, and in many cases these were combined: the Templars' hospice buildings in Palestine usually included a fortified church. No complete example remains, but there is a comparable late survivor at Luz (1260) in the French Pyrenees. The great inland castles almost invariably had a chapel, and Tortosa has a cathedral church. Churches were built, or more usually adapted from existing buildings, in many of the holy places. The centres of administration, however, and the communication network, were based upon the castles. Contemporary descriptions indicate clearly the importance of the castles as the secure centres of agrarian communities dependent upon the cultivation of the surrounding land, and owing allegiance to the feudal lord whose fief extended over the country commanded and protected by the castle.

## Gothic Culture

While the Crusades of the thirteenth century atrophied and the Latin empire in the east dissolved, in northern Europe the energetic development of Frankish architecture produced buildings with pointed masonry arches and with vaults capable of covering the vast naves and transepts of the churches built on the plan forms evolved from Romanesque models.

It is essential to realise that Gothic was fundamentally an ecclesiastical style. This does not mean that Gothic architects did not build castles and houses. But the style was seldom at its best or fully realised in secular buildings. In every castle the chapel always looks more Gothic than the rest. It was eminently suited for vast vaulted halls, and not at all for small rooms, especially if they had to be placed on several floors. It was not impossible to construct one areas clunch was reckoned to be adequate for walls; and the art of knapping flints for use in building became something of a speciality in Kent and Essex, where they were plentiful. But material conditioned quality, and it is only necessary to compare what could be done with the granites of Brittany or the volcanic stones of the Auvergne, on the one hand, and the limestones to the east and north on the other, to realise the extent to which the Gothic style was a stonecutter's art.

The exploitation of local materials was an economic necessity. To move stone any distance was slow and expensive. Costs became prohibitive when it had to be moved overland. The only effective way of transporting quantities of stone over long distance was by water—even by sea, which explains why Caen stone found a market in England throughout the Middle Ages. As cathedrals and abbeys were the first large-scale users of stone, they had a vested interest in acquiring and working quarries, and the economics of church-building were for a long time handled by the ecclesiastical authorities themselves. This tended to put a limit on the scale and pace of operations. We can obtain a glimpse of the hand-to-mouth way in which work was carried out, even on an immense undertaking like the building of Dover Castle, from the building accounts of Henry III. It must have been apparent that stone would be needed in hundreds, even thousands of tons, yet it was ordered by the cartload, on a day-to-day basis. Quantity surveying, if it existed at all, was evidently at a rudimentary stage. But in the course of time, as the building industry diversified, it became expedient for masons to cope with all the problems of supply and to become in effect contractors. It was in this way that a mason like Henry Yevele in England could become prosperous enough to make his mark in the City of London.

Contracting was one of the ways in which masons made money; but the social status of the profession was bound up with the transformation of the stonemason into someone recognisable as the modern architect. There is an important sense in which the history of Gothic is reflected in the emergence of the architect as the designer of buildings. To imply that architects in previous periods did not prepare designs is perhaps an overstatement. No doubt Romanesque masons always had some idea of what they intended to do before they started to build; and no doubt most Gothic churches show signs of having been altered in the course of construction. It is a matter of degree and of complexity. The sense of a controlling overall design, even in such a relatively elaborate Romanesque building as Durham, is rudimentary, whereas at Laon and Bourges it is overwhelming, even though they took several generations to build, and more than one master was in charge of the work. They were thought out, right down to the level of quite small details, before a stone was laid. By comparison, Durham can almost be described as a happening.

## Building Techniques and Processes

### Prehistoric Periods

Throughout the Paleolithic period the basic forms of building were a teepee-like tent or oval hut of framed timber or bones. In some places additional protection was achieved by partially digging the dwelling into the ground.

Most of the houses built during the Mesolithic period were light wooden constructions of which little remains. The major developments appear to have occurred in finishes and forms of decoration, and in the adoption of different techniques for summer and winter dwellings.

Neolithic houses were detached, timber-framed with pitched and gabled roofs. They were built across much of Europe, although techniques and practices varied widely in accordance with plan forms and local materials. Mud and wattle were generally used as infill and reeds or thatch as a roofing material. Elsewhere, drystone dwellings were built. The Neolithic peoples were skilled in the working of stone, knew the precise properties of the parent rock and had highly developed methods of quarrying and dressing stone. The megalith builders used a range of drystone techniques including corbelling and coursed masonry walling. Copper smelting was practised in some parts of Europe.

Metalworking techniques were evolved throughout the Bronze Age, and included the sinking of deep mineshafts, and the smelting, casting and cold working of metals. Architectural development was almost entirely linked to the complex systems of ramparts and strongpoints in the landscape.

By the close of the Iron Age, building technology had become much more sophisticated. Increasingly complex carpentry and joinery were made possible by new tools such as the lathe, two-man saw and high-quality adzes. Improvements in timber technology, and the use of new materials like brickwork, were brought about by the need for stronger defensive systems. It has been argued that some of these new developments and techniques were imported from Greece and the ancient Near East.

### Etruscan and Early Roman Period

The first Etruscan and Roman builders used the locally available materials in the simple ways that were characteristic of primitive building everywhere. By the seventh century BC, techniques that had long been common in Greece and elsewhere were introduced. Timber was used for free-standing columns, for spanning openings, and for the framing of walls and roofs. Where, in the more important structures, timber was exposed to the weather, it was given some protection by coverings of tiles and facings of terracotta. Unfired mud brick and undressed stone were used as infillings in timber-framed walls or were used as building materials in their own right. But as neither timber nor unfired brick was durable enough to last for long, even with some protection, first-hand knowledge of these techniques is largely limited to stone.

The way it was used varied with the nature of the stone. The soft volcanic tufa found chiefly in the neighbourhood of Rome could be cut easily into squared blocks and thus lent itself to construction in squared ashlar—which became known as 'opus quadratum'—from an early date. The harder limestones that were commoner elsewhere were less easily cut in this way. They were used initially, therefore, either as undressed rubble or, where maximum strength was required as in city defence walls, in a partially dressed polygonal form which allowed the blocks to be closely fitted together on the outside. No mortar was used in ashlar or closely fitted polygonal work, though the interstices behind the closely fitted joints would be packed with earth and smaller stones; when the wall was really a facing to a raised terrace or a podium, it would be completely filled in this way. Where rubble of smaller size was used a bonding mortar was necessary, however, and mortars composed simply of lime and sand seem to have been introduced from the Greek colonies in southern Italy by about the early third century BC.

Openings, even in masonry walls, would usually have been spanned by timber beams or lintels. In the earlier massive defence walls few gateways have survived to their full heights unchanged, and those that exist suggest that up to the third century BC the openings were always spanned by corbelling the masonry on each side to narrow or close the gap. It was thought that voussoir arches were constructed by the Etruscans much earlier than this and were used, for instance, in the Cloaca Maxima in Rome and the Porta all'Archo in Volterra in about the sixth century BC, but both the arched outlet of the former to the Tiber and the arch of the latter are much later reconstructions.

The earliest surviving voussoir-arched gates in central Italy date only from the later part of the third century—that is, from a time when Etruscan power had largely succumbed to Rome. Thus it seems almost certain that the stone voussoir arch was introduced to Italy from Greek colonies in the south, or from Greece itself—where it had made its appearance somewhat earlier, possibly inspired by the brick arches that had long been common in Egypt and Assyria. At about the same time it began to be used for road bridges and, in the form of the barrel vault, for roofing small underground tomb chambers, conduits, and the like.

## Later Republican and Early Imperial Rome and Italy

The main development of the stone voussoir arch took place in the second and first centuries BC, particularly where the surrounding masonry or earth could not provide structural support—as they could, for example, in openings in continuous walls or in underground structures.

The really significant contribution of Roman builders to the early development of the arch—and then of the barrel vault—was to support it on free-standing piers. The full story cannot be traced without records of initial failures, but it is reasonable to surmise that the idea arose from the construction of bridges and aqueducts which called for several arched spans to be carried on quite low broad piers. The arch profile, it should be noted, was always semicircular (p.183). This facilitated cutting of the voussoirs and construction of the timber centering on which the arch was erected. Bearing in mind that the arch ring was always substantial in relation to the span and that the haunches were always loaded by masonry placed above them, this profile was at least as efficient structurally as any other. In fact, the stability of any arch is far more dependent on the firmness of its supports than on its profile, which only becomes significant when the arch ring is shallow and there is no stiffening by masonry over the haunch.

There is, however, one partial exception to the universality of the semicircular profile to be noted. This is not an arch proper but another way of overcoming the lack of stone suitable, like Greek marble, for wide-spanning architraves. Single blocks of stone with sloping ends were set over the columns, and the gaps between them were then closed by dropping in further blocks with their ends cut to fit—a procedure that was to lead to the construction of flat lintel-like arches consisting of a larger number of voussoirs.

Alongside this development of the stone voussoir-arch in republican Rome, there were three other related developments in construction. The first was simply the more widespread use of cut stone where previously timber, rubble, or mud brick had been used—a parallel development to that which had taken place centuries earlier in Greece and Asia Minor, and even earlier in Egypt. As it occurred at the time when Roman expansion brought close contact with Greece and the Hellenistic world, it may have been inspired by this contact if not actually brought about by Greek architects. With it was associated the practice—also adopted earlier in the east—of fastening the blocks of stone together with bronze or iron cramps and dowels. The second and third developments, which eventually were largely to displace the first and to be of the greatest architectural importance, were the use of improved mortars to make a building material analogous to modern concrete and, linked with this, the introduction of stresses the necessity of a theoretical background in the then-known mechanical sciences for the leading practitioners, suggesting that there may have been a substantial increase in professional expertise at the highest level.

It was men with this background who were later chosen by Justinian for his major commission, the church of Hagia Sophia in Constantinople. It is clear from the magnitude of this undertaking, and from the scale of Justinian's other building works as recorded by the court historian Procopius, that, by the early sixth century, there was no longer any shortage of resources in the East, however much the position might then have deteriorated in the West. Some of the marble quarries that had supplied the earlier Roman Empire were no longer active, but many were still working and there was a large production of finished marble elements from the quarries of the Proconessian islands in the Marmara. There were ample supplies of fired brick, still of much the same type as had been introduced centuries earlier in Rome. And there was even an extensive use of iron—more extensive than at any earlier time.

It is equally clear that these conditions did not last. From the later sixth century onwards, all building works were on a much smaller scale. When, for instance, churches had to be rebuilt, they were almost invariably reduced in size—a change that cannot be wholly explained by the fact that it was no longer necessary to accommodate such large numbers of people. Nor were there any significant additions to the available materials in the later Byzantine Empire. On the contrary, choice was increasingly restricted. Even before this, long straight pieces of timber had already become scarce as a result of clearances of forested areas, and many earlier sources of marble were no longer accessible or the quarries were no longer worked, so that there was an increased dependence on what could be salvaged from earlier buildings.

## Romanesque Period

The adoption in the Romanesque period, and more especially in the growing economic prosperity of the eleventh and twelfth centuries, of the basilican plan for abbeys and cathedrals laid emphasis, in terms of resources, upon the skills in design and execution of masons and the availability and accessibility of supplies of suitable stone for building. That is not to say that other skills and materials were unimportant. Brickmaking, for example, in north-west Italy, was also vital (S. Ambrogio, Milan, is a brick building), as were supplies of timber which continued to be used for roofing during this transitional period in the continuing development of stone vaulting into groined systems capable of spanning naves as well as aisles. Fire risks, both from accidental causes and under military attack, provided the primary motivation, but it was also necessary somehow to reduce the weight and complexity of both the centering system used in construction and the weight of such stone roofs as those of the Burgundy churches.

In some locations diverse skills and materials were combined in interesting transitional buildings. For example, S. Miniato, Florence, begun in the first quarter of the eleventh century, had a timber-framed roof over a marble-colonnaded nave, but was now divided into three compartments with transverse stiffening arches in place of the timber or metal ties used at Torcello and elsewhere.

Mosaics and wall painting continued to be executed, especially in those areas directly in touch with the Classical or Byzantine traditions, and such direct contacts, for example in south Italy and Sicily, still produced decorative bronze panels which were used to face pilasters, or to decorate wall panels.

There was little glass used in building before the ninth century, although for more than a century previously the demand for glass for churches had already begun to change the emphasis of glass production in the Seine-Rhine regions from domestic ware to window glass. Blown and spun so-called 'crown' or 'bullion' glass was produced by Syrian workers in the imperial Roman period; the Venetians learned the skill from them, and it was from Venice that the method passed across Europe to Normandy and to Britain. There is evidence that stained glass was used in Constantinople, but its development is associated with northern Europe and the earliest examples are in the later Romanesque churches.

The principal glory of Romanesque achievement, however, is in figurative and non-figurative sculpture, designed and integrated with structure and construction. Thus the availability of stone was of prime importance to the style but the availability of materials determined the constructional as well as decorative modes used in the countries and regions concerned.

### *Italy*

*Central Italy*. Tuscany possessed great mineral wealth and an abundance of stone. Various building materials were used in Rome, including bricks, volcanic tufa or peperino, travertine stone from Tivoli, and marble from Carrara and from Paros and other Greek islands. Much material was also obtained from the ruins of Classical buildings.

*North Italy*. The low-lying plains of Lombardy supplied clay for making bricks, which, used with marble from the hills, gave a special character to the architecture. Venice imported marbles in her merchant vessels.

*Southern Italy and Sicily*. The mountains of south

Italy and Sicily supplied calcareous and shelly limestone as well as many kinds of marble, while the sulphur mines, especially those of Sicily, largely contributed to that prosperity which was conducive to building enterprise.

### *France*

France has an abundance of good stone, easily quarried and freely used for all types of buildings. In the north the fine-grained Caen stone was available throughout Normandy. In the volcanic district of Auvergne the coloured pumice and tufa were not only used for walls and inlaid decoration, but were so light in weight that they were also used in large blocks for the vaulted roofs peculiar to the district.

### *Central Europe*

Stone from the mountains along the Rhine Valley was the material used for buildings in this district. Along the Baltic shores and in central and southern Germany there was an ample supply of timber. As there was no stone or timber in the plains of the north, brick was used almost exclusively in the district east of the Elbe, and the style consequently differs from that of other districts.

### *Spain and Portugal*

The Iberian peninsula itself is a great rock massif, including the Sierras of Castile in the north, the mountains of Toledo in the centre, and the Sierra Morena in the south. Natural resources in building stone include granite in the north; limestone in the south and the Ebro basin; red sandstone in the Pyrenees and Andalusia, and both eruptive rock and semi-marbles distributed everywhere. Building generally relied upon the use of these stone sources. The eruptive rock served for rubble walling with brick bonding courses and quoins, which was used under Muslim influence with much success, as in the towers and gates of the city of Toledo; while in Valladolid bricks of Roman character are laid in thick mortar beds. There are few forests in Spain, and the conspicuous absence of timber suitable for building accentuates still further the predominance of stone in architecture.

### *The Holy Land*

Here stone materials of eminent suitability for great castles and small churches were abundant, though timber was not as plentiful as in those parts of Europe from which the Crusader builders had come.

### *Britain*

The varied geological formation of Britain was responsible for a wider variety of building materials, and in early times the survival of remains from the Roman occupation provided ideas for variety in the methods of using them. In some instances, the Roman buildings provided opportunity for reuse of the materials themselves. The English hardwood forests, particularly in the north-western and south-eastern counties, provided roof-framing material for the more important buildings, and for lesser buildings which were entirely timber-framed. Most of the indigenous building stones were used in military and religious buildings. Local characteristics in masonry developed at an early stage, if only because of the difficulty of transport over long distances. Consequently, walling in flint is largely confined to East Anglia and the chalk hills in the south (where it is often associated with circular plans because of the scarcity of freestones for quoins). Stone from Caen in Normandy was brought by means of sea and river transport for some building work under royal patronage. Except for isolated and mostly early instances of the reuse of Roman brick, it was not until Gothic had succeeded Romanesque that brickwork was redeveloped as a building material.

## The Gothic Style

The introduction of the pointed arch and vault as a means of covering a rectangular shape on plan took place over a fairly long period in Europe; this makes it difficult, and in a sense unnecessary, to date the beginning of the Gothic period. But the flowering of the style and the refinement of its ethereal qualities depended largely upon the master masons of the time.

The foundation of their skills was an ability to cut and shape stone. There were Gothic carpenters of distinction, especially in England where the profusion of hardwoods in the deciduous forests sustained their efforts to rival the stonemasons; and right across northern Europe, from Belgium to Lithuania, brick was often used to great effect in place of stone. But the essence of the style was its stonework, and the best Gothic buildings depended on the plentiful supply of easily worked, fine-quality freestone.

Many of the best quarries were associated with the Jurassic limestone belt that lies diagonally across England from Yorkshire to the Dorset coast, and reappears across the Channel in the vicinity of Caen, whence it runs in a vast sweep, south via Le Mans and Angers to Poitiers, then eastwards, past Bourges, and north through Champagne. Of course other stones could be used. In the west of England and up and down the Rhineland from Holland to Basle, local red sandstones were perfectly satisfactory. In chalk support did nevertheless increase, as for any other form, as the inside surface became more nearly horizontal. For this reason some of the earliest domes were more conical than hemispherical, and in later domes it was usual to evade the most difficult operation of closing the crown by leaving it open to the sky.

Less needs to be said about the arch. The introduction of fired brick led, of course, to the construction of arches that were the direct counterpart of the earlier mud-brick arches of Egypt and Mesopotamia, but in brick-faced 'opus testaceum' the arch was largely absorbed into the wall; only a few of its bricks were whole bricks penetrating through the full thickness of the wall. Once the mortar had hardened, the concrete largely took over. Semicircular profiles remained usual, although flatter segmental arches were used over smaller door and window openings, and even arches with completely flat soffits where, earlier, there would have been stone lintels of flat stone arches. The generally conservative and always empirical approach of the builders led, however, to the continuance of the practice previously adopted in ashlar 'opus quadratum' of placing a second full semicircular arch over the flat lintel-like one to relieve it of load if it later proved to be too weak by itself.

Finally, a fourth development of a different kind about which much less is known in detail was concerned with timber trusses to allow the construction of wider-spanning roofs carried on less massive walls than would be called for by concrete vaults. Precisely what forms the early roofs took is unknown because none survive and there are no adequate descriptions. Vitruvius, writing in the first century BC, suggests that at least the principle of tying together the feet of sloping rafters by means of horizontal timbers spanning between them was known in his day.

## Later Developments in Imperial Rome

In major surviving monuments of the second half of the first century AD it is possible to see most of the types of construction described above except the timber roof-truss. By the early second century, brick-faced concrete was used almost universally for walls and for all but the most heavily loaded piers. It was faced with stucco or marble, frequently having nails driven into the mortar between the facing bricks to provide a better key or anchorage. Vaults were all constructed of concrete, sometimes with tiles laid flat on the timber formwork to provide an initial undersurface. Terracotta or lead flues, drains, water supply pipes and the like were buried in the concrete as construction proceeded.

Later there were gradual changes in the composition of the concrete, with a tendency to use more broken brick and less mortar. To lighten vaults, voids were deliberately created within the massive haunches by incorporating empty amphorae. And there was a progressive introduction of what look like embedded ribs of brick, associated with the use of lightweight cementae in the intervening concrete. They appeared not only where they might first be expected—along the groins of groined vaults—but also running transversely at intervals in simple barrel vaults and both radially and circumferentially in some late domes. Though they have sometimes been likened to the ribs of much later Gothic vaults, and though they did sometimes survive when the surrounding concrete fell, there is little true likeness because they were built up integrally with the concrete rather than completed ahead of it, because they never projected below it, and because little care was taken over their precise form. They should also be distinguished from the rib-like surface patterns that resulted from forming coffers on the under-surfaces of vaults and domes. Such coffers were formed simply by suitable formwork, and the concrete of the rib-like projections was cast integrally with the remaining concrete without any distinction in its composition or the setting of the cementae.

The buildings of this period display vaults of almost all conceivable forms including, in particular, dome-like vaults whose inner surfaces are alternately concave and convex or consist of many similar lobed sections. At lower levels they often incorporate small triangular transition sections which enable them to spring from supporting walls or arches that are octagonal or decagonal in plan. Only very small domes were set over square bases; larger square or rectangular rooms or bays were normally covered by groined vaults.

However monolithic the concrete of a vault was initially, it was subjected to bursting stresses in the same way as any other material similarly used. It cracked, and then thrust outwards just as a masonry vault would have done. By what sequence of failures Roman builders learnt how much buttressing these thrusts required we do not fully know. Surviving structures show the fruits of experience: substantial systems of supports which buttressed the thrusts either by sheer bulk and weight or, with less bulk, by their form. In the latter category were outwardly curving walls crowned by semidomes. Piers that projected outwards from the line of support were commoner. Sometimes these were penetrated at floor level by arched openings to reduce the obstruction they created.

The building process had at least some of the characteristics of that process today in that it was highly standardised in many ways and must have been just as highly organised. There is ample evidence of mass production, not only of standard-sized bricks and similar small units but even of large marble columns. The use of concrete for most of the carcass meant that the need for highly skilled labour was greatly reduced. The most demanding tasks would have been the initial setting-out, construction of the timber centering that supported the formwork for large arches and vaults, and some of the finishing operations. In larger structures care often seems to have been taken to make possible the repetitive reuse of centering frames, which would have called for appropriate provisions for easing the frames away each time the concrete had set sufficiently.

## The Wider Roman Empire

Outside Rome and its vicinity it was often necessary to adapt building techniques to local resources, except in those eastern and North African provinces where it was possible to continue to use earlier traditional methods with little change.

Adaptation of Roman techniques in the western provinces of Gaul and Britain included the development of another type of masonry rather like a multilayer cake. Layers of mortar-bound rubble of stone alternated with layers composed of several through-courses of flat bricks. These brick courses ensured the overall strength of the wall where the strength of the mortar-bound rubble concrete could not be relied upon. Elsewhere, where there was a suitable stone, construction in fine ashlar continued long after it had been superseded in Italy. Less commonly, notably in parts of the Balkans and Asia Minor, walls were built throughout of flat bricks of the usual Roman proportions.

The construction of vaults does not seem to have been attempted on the same scale as in Rome. Concrete was used much less. In its place there was a more widespread use of bricks and cut stone. Brick vaults, being constructed by a different process, were not given the exaggerated thicknesses at the foot that were characteristic of concrete vaults: they were much more uniform in thickness with weighting added around the foot at a later stage of construction. Sometimes ingenious patterns of bricklaying were adopted to reduce or even eliminate the need for centering. A further development with the same objective was the use of interlocking hollow tubes which could be laid in a continuous spiral that gradually closed in towards the crown. These differences in construction meant that there was much less freedom to depart from forms with simple cylindrical or part-spherical inside surfaces.

## The Early Christian Period and the Byzantine Empire

**As the early Christian period was one of straitened resources it was not notable for major developments in technique. For reasons that will be discussed later,** the commonest new building type was a variant on the much older basilica—an aisled rectangular hall with, usually, a timber roof. With no recent precedent for the largest of these structures, there was probably further development of the trussed timber roof. Except in those regions where ashlar stonework remained the normal technique, walls were now more frequently constructed of brick throughout their thickness.

When, in the reign of Justinian, works were again attempted that bore comparison with the highest achievements of imperial Rome, some of the techniques seen in Roman monuments in Asia Minor, in places like Thessaloniki and in Rome itself were still sufficiently alive or understood to be used again. There was no more Roman concrete but, in its place, there was fine ashlar in heavily loaded piers, and elsewhere solid brickwork set in mortar which had an admixture of crushed brick to make good the lack of natural pozzolana—both of them finally sheathed, as before, in stucco, marble, or mosaic. Roman forms of pier, vault, and buttress were also used. There are, finally, the chief contributions of Byzantine architects to the repertoire of structural forms and their uses—the fully developed pendentive and the use of the semidome on a scale never before attempted, to buttress a thrust from above.

These innovations occurred in the construction of Hagia Sophia in Constantinople and are described more fully below. On a smaller scale, however, the pendentive became so characteristic of later Byzantine architecture that it must be given some attention here. It might be regarded either as a development of the small triangular infill regions by means of which earlier Roman domes were set above polygonal bases, or as an isolated triangular portion of a dome set directly over a square base and large enough to extend to the corners of the square. As each of a group of pendentives rises out of its corner, it gradually closes in towards the adjacent ones until all four meet in a complete circle. Byzantine pendentives were normally constructed of brick with some solid backing to resist the subsequent outward thrust. Above the final circle there was usually a cornice of stone, and on this the dome was constructed.

Byzantine domes and other vaults were also nearly always built of brick, which was often laid in such a manner as to eliminate or reduce the need for centering. Profiles of both arches and domes were usually semicircular, though ill-defined slightly pointed forms were used occasionally on a small scale and flatter segmental profiles on a larger scale when the rise of a full semicircle would have presented difficulties. Extensive use was made of visible ties of iron and of corresponding members of timber spanning between the springings of arches, though the latter would be equally if not more effective as struts and probably were introduced primarily to facilitate construction. Finally, probably in the ninth or tenth century there fired brick of tile-like proportions in place of the earlier unfired brick.

Reference has already been made to the improved mortar incorporating natural pozzolana, known at the time as 'pit sand' to distinguish it from river and sea sand—for which it must have been regarded simply as a straight substitute until the superior quality of the mortar made with it was realised. Its use in place of the simple lime-sand mortar used previously in walls made of rubble stone could create an almost monolithic mass when it had fully hardened. Moreover it was capable of hardening without access to the air, and hence could do so both in the heart of large masses of masonry and under water. On account of this last property it is commonly referred to as a 'hydraulic' mortar.

To build a foundation or a wall, barrow-loads of stone and mortar were tipped in layers, one after the other. There was no premixing as today. But there was a need for some sort of containment of the fluid mass, especially as the practice developed of using quite small stones or pieces of broken brick—'cementae' as they were called—and liberal amounts of mortar. Concrete for a foundation was usually confined between formwork made of timber boarding fixed to vertical studs. For walls above ground, however, facings of a more permanent character were preferred.

The earliest wall facings were of stone, much like the ashlar and polygonal masonry of earlier walls, but made from much smaller pieces of stone—a mere 100 mm (4 in) or so across. At first these were dressed only on the outside face if at all, giving the wall the appearance of rough small-scale polygonal work. The result was then known as 'opus incertum'. This led to the use of similarly sized pieces of soft tufa dressed square on the outer face, and cut pyramidally to tail back into the concrete behind so as to obtain a good key. These pieces were then set lozenge-fashion to create a net-like pattern on the surface, so that the resulting work became known as 'opus reticulatum' In both these forms, larger blocks of square stone set in the normal manner were used to give greater strength to the vertical angles (p.183).

Later, in 'opus testaceum' and 'opus mixtum', facings of fired brick were substituted for the reticulate tufa or combined with it, using brick at the corners in both cases in place of stone quoins. Most of the bricks were cut to a triangular form, tailing back into the concrete core to give a good key. But at intervals in the height of the wall, full bricks were laid across its whole thickness, presumably to bond the two facings together until the mortar hardened and to mark the end of a fresh 'lift', and to provide good seating for the short poles that were built in, as work proceeded, to support platforms for the workmen to stand on.

As these different manners of facing the concrete are such conspicuous features of surviving Roman monuments, and because they succeeded one another over a period of about two centuries in such a way as to serve as one indication of approximate date of construction, there has been a tendency in the past to exaggerate their importance. Architecturally, and even structurally, once the mortar was set, they are of little significance. It must first be emphasised that it was the concrete core on which the strength of the finished wall chiefly depended. Secondly, however well finished and decorative the facings were, they were rarely the final finish; they were usually covered by stucco or marble both inside and out.

The most important consequence of the introduction of concrete was the stimulus it gave to the development of all kinds of vault, which can be followed through from the early second century BC in the region around Naples, where natural pozzolana was first used, to almost the end of the imperial period.

Like all arches, most vaults require temporary support while they are being built. This is true to much the same extent whether cut stone is used or concrete, but the more fluid the concrete is initially, the more need there is for continuous support over the whole inner surface. Timber formwork was mostly used for this purpose. Initially it was not fully realised that its presence, coupled with the initially almost monolithic character of the set concrete, obviated the need for a voussoir-like setting of the cementae. When this was realised, the cementae and mortar were simply tipped on the formwork in horizontal layers as they were when building a wall. As a result of this practice vaults were given a stepped external profile, or one that was simply vertical-sided up to a much flattened, almost conical top. The concrete of each layer could then be confined on the outside by means of vertical boarding or a permanent vertical-sided brick facing until the inward slope of the inner surface became flat enough for the remaining concrete to be finished externally to a similar slope without any containment. Successive layers were stepped back as the vault closed inwards and gave worthwhile saving of material and labour.

Even the simple groined vaults used in Hellenistic architecture had called for complicated dressing of the blocks of stone forming the groins. The use of concrete for vaulting was important because it did away with the need for this complicated stone-dressing and permitted a much freer choice of vault form. Because the concrete could take any form defined for it by the timber formwork and, whether it was then realised or not, because the practice of making the vaults vertical-sided at the foot resulted in such large relative thickness here that stability was scarcely affected by the geometry of the inner surface, this choice was now limited chiefly by the skill of the carpenter.

The dome was the simplest form of vault to build, as it always had been, and it continued to be the one with which the largest spans were achieved (p.295). The difficulties of providing adequate temporary promontories. Those on steep slopes were usually restricted to the provision of ramparts at the most vulnerable points. In some cases these were multivallate. Defences on gentle slopes usually took the form of encircling ramparts. Low-lying forts had massive encircling ramparts enclosing a roughly circular or oval area. Rampart construction has been classified into four types. The most common was that in which two plank walls were erected 2 m to 3 m (7 ft to 10 ft) apart, with tie-beams between them; the space between the palisades was filled with earth and rubble. In the second type, usually found in upland areas, stone was substituted for timber. A third type, of earlier date, consisted of a timber grid; parallel rows of timbers were laid in consecutive layers at right-angles to each other, the interstices were filled with wood chips, earth and stone, and the whole was capped with planks. A fourth and chronologically later type of rampart consisted of rubble-filled boxes.

The Bronze Age also saw the evolution of fortified buildings of some sophistication, namely the torre, nuraghi and tayalot towers of the Mediterranean islands.

### FORTIFICATIONS

Early examples of late Neolithic and early Bronze Age fortifications have been found on the Iberian peninsula at **Los Millares**, Spain (*c.* 2340 BC), where the settlement was surrounded by a stone wall with semicircular bastions. Similar examples are to be found at **Villa Nova de Sao Pedro, near Lisbon**, Portugal, where a small chieftain's castle was defended by means of a bastioned wall, and at **Zambujal**, also in Portugal.

The fortified settlement of **Biskupin**, Poland (1660–500 BC) (pp.205, 207C) was a fine timber-palisaded fort; here the exterior was coated with clay to prevent burning, and the interior was supported by massive timber revetments. It is thought that the stockade was originally some 5 m to 6 m (16 ft to 19 ft) high, with crenellations and a protected high-level walkway. Biskupin was entered through a gate-tower and entrance causeway. Similar settlements have been discovered throughout the region of **Lausitz** in Germany (p.207A).

### STONE TOWERS

Torre have been found in Corsica dating from the early second millennium BC. These circular towers ranged from 10 m to 15 m (33 ft to 49 ft) in diameter, and were built in drystone walling. Some had an internal corridor, and were about 3 m (10 ft) high, whilst others, standing up to 7 m (23 ft) high, had a main chamber roofed by means of false corbelling. It has been suggested they served both defensive and ritual purposes. The most famous torre are at **Filitosa**, where standing stones in the shape of warriors were incorporated into the buildings, but those at **Foce** (p.207D) and **Balestra** are more typical.

Nuraghi, or circular defensive stone towers, have been found in Sardinia dating from 1800 BC onwards. These ranged from single tower units to complex structures with curtain walling and extra towers for technologically related activities. Early towers contained a single chamber and later had up to three floors of accommodation with sleeping niches let into the walls. The nuraghi at **Murartu** and **Sa Coa Filigosa** (p.207D) were typical of the period, but the tower at **Sant'Antine** (p.207D) was a later, more developed example with a central tower and triple defensive corner towers linked by a wall. The whole was built to withstand siege artillery and battering rams.

There are square and round tayalot towers in the Balearic Islands dating from about 1400 BC. These were stone-built towers, about 10 m (33 ft) in diameter. Some of them were completely solid, whilst others contained rooms at ground level or upper levels, the latter approached by external ramps or internal stairs. Typical towers were at **San Agusti Vell**, Minorca, **Cala Pi**, Lluchmayor (p.207D), **Son Lluch**, Majorca, and **Plana d'Albarca**, Escura (p.207D).

## Iron Age

### *Dwellings*

Iron Age houses continued to fall into the two constructional types found in the Bronze Age, namely timber-framed and drystone. Architecturally elaborate houses are rare in continental Europe, but domestic architecture continued to develop in Britain, where a tradition of detached farmsteads was maintained throughout the period.

### TIMBER-FRAMED HOUSES

Perhaps the best-known housing from the prehistoric period is at **Little Woodbury, near Salisbury**, in the south-west of England (*c.* 300–100 BC) (p.197K). The principal building was a circular timber house, over 15 m (49 ft) in diameter, set within an oval timber-palisaded enclosure 120 m × 90 m (394 ft × 295 ft) overall. The palisade consisted of upright stakes about 2 m (7 ft) high set edge to edge in a trench some 300 mm (1 ft) deep. The main house was defined by four groups of post-holes. Those in the outer ring held oval posts, each 450 mm × 300 mm (18 in × 12 in) in section, and these supported the outer wall. The main roof-support was probably provided by a second ring of posts, each 300 mm to 375 mm (12 in to 15 in) in diameter, and by the four

four circular huts of which the largest was about 7 m (23 ft) in diameter, with a ring of 250 mm (10 in) timber uprights supporting a thatched roof, and beyond it an independent, light outer wall. The remains suggest that there may have been a small porch in front of the entrance. The other three huts ranged in size from 4.8 m (16 ft) to 6 m (19 ft) in diameter and were similarly constructed but without porches. The latter buildings, it has been suggested, were roofed shelters for livestock. The remaining three enclosures contained a further four huts, and there were an additional five huts outside the palisaded area. Only four of the huts appear to have been dwellings, whilst the remainder served as outbuildings. Smaller groups with similar arrangements have been found at **Thorny Down, Salisbury**, and **Plumpton Plain**, both in England.

## *Burial Mounds*

The beginning of the Bronze Age was marked by the first individual or single-grave burials beneath circular mounds, and there is great variety in their external form, interior arrangements and grouping. At their simplest, barrows consisted of only an earth or stone mound; in more complex examples, as well as mounds there were timber mortuary houses or stone cists to contain the corpse.

The barrow at **Leubingen**, Germany (*c.* 1500 BC) (p.200N), was 34 m (112 ft) in diameter, and stood 8.5 m (28 ft) high. The central cairn was delimited by a ring-ditch some 20 m (66 ft) in diameter, and it covered a thatched oak burial-chamber built with eighteen posts arranged in a rectangle 3.9 m × 2.1 m (13 ft × 7 ft). The chamber was triangular in section, with the side-supports set at an angle and notched into a central timber ridge-post. The side-supports also were notched to receive the boarded timber floor. The mortuary house itself was made of oak planks and thatched. It contained a single grave. Another example of the same date at **Helmsdorf**, also in Germany, lay under a cairn of similar dimensions, but did not have a ridge-post. Stone revetments retained the side-supports to the burial chamber, which had a sandstone paved floor at the northern end and a reed floor at the southern end. The cairn was also contained within a stone wall.

## *Temples and Ritual Structures*

The remains of Bronze Age temples are flimsy by comparison with the megalithic buildings of the Neolithic period. Small temple-like structures have been excavated at the sites of **Tustrup**, Denmark (mid-third millennium BC), and at **Salacea**, Russia, in the Carpathian Basin. The latter had three rooms, measured about 8.8 m × 5.2 m (29 ft × 17 ft) overall, and had a megaron-like porch which led to a room containing a hanging altar, and from there to a large squarish room with a plaster frieze and two fixed altars on raised clay platforms set against the side walls. Six post-holes in the floor may have held supports for the roof, which was of reed thatch. Similarly, remains from the site of **Bargeroosterveld**, Holland (*c.* 1050 BC) may indicate an open-air temple or shrine-like structure.

Henges and open-air ceremonial sites continued to be built in Britain during the Bronze Age. The best-known of the British henge monuments, **Stonehenge in Wiltshire** (p.200J), was unique rather than typical, although the sophistication of the original structure and the many refinements made later suggest that its designers were drawing on a well-established architectural tradition. The first, late Neolithic and Early Bronze Age, phase (*c.* 2600 BC) consisted of earthworks, a low bank 30.5 m (100 ft) outside the stones, an outer ditch, and a number of standing stones and timber structures of uncertain kinds. The second (Bronze Age) phase (*c.* 2100 BC), involved the erection of two concentric stone rings, 22.5 m (74 ft) and 26 m (85 ft) in diameter; there were 38 dolerite or bluestone blocks from Pembrokeshire in south Wales in each ring and all were set in radially arranged pairs. The final phase, dated to the middle and later Bronze Age, entailed the clearing of the central area and the erection of 82 completely new stones. Sarsen blocks, each averaging over 26,000 kg (57,300 lbs), were brought from Marlborough Downs 32 km (20 miles) to the north and set upright in the circle and horseshoe arrangements which remain today. The lintel stones were dovetailed into each other, and morticed and tenoned into the uprights, which were themselves carefully shaped to counteract the effects of perspective. The inner and outer faces of the lintels were curved so that the completed ring formed an almost perfect circle. The stones of the horseshoe setting were erected in five groups of three trilithions. The axis of the sarsen setting pointed to the midsummer sunrise. In an intermediate phase, the dismantled bluestones were reset in an oval arrangement inside and outside the sarsen horseshoe, but in about 1800 BC the arrangement was given its final form, in which sixty of the bluestones were set in a circle between the sarsen horseshoe and the outer circle, whilst a horseshoe of nineteen bluestones was placed inside the trilithions in an arrangement which increased in height towards the centre of the setting.

## *Defensive Structures*

One of the most remarkable types of structure in later Bronze Age Europe was the fort or stockade. These ranged from palisaded forts in low-lying areas, to hill-forts on low hills or knolls and spur forts on steep

# Chapter 9

# ROME AND THE ROMAN EMPIRE

## To the barbarian invasions

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## Architectural Character

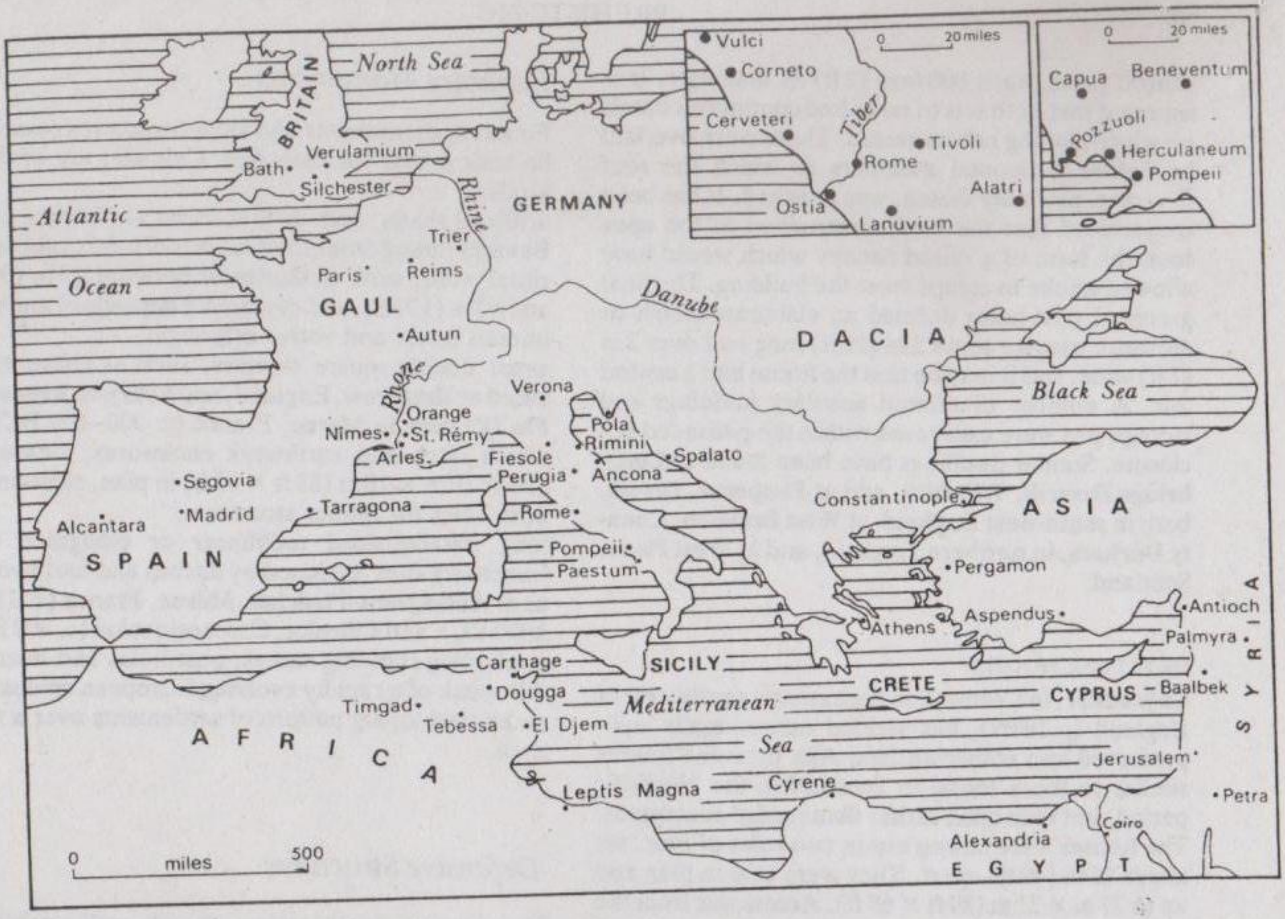
### Etruscan and Early Roman

Up to the seventh century BC there were no buildings of architectural significance in central Italy. Both the findings of archaeology and the surviving literary sources from a somewhat later period show that late Bronze Age and early Iron Age dwellings had not evolved beyond primitive huts (see Chapter 8), and that even temples were no more than sacred enclosures with simple open-air altars. Indeed the word 'templum' originally meant only a space on the ground or in the sky marked out for the purpose of taking omens. A rock-cut tomb at Cerveteri—the so-called Tomb of the Thatched Roof, probably of the early seventh century—represents a typical hut, with low walls, probably of wattle and daub, low benches of earth or rubble around them, and apparently, as the name indicates, a thatched roof.

In the sixth century, under the influence of Greek and other traders from the eastern Mediterranean, houses of the Greek megaron type seem to have appeared, to be followed by larger houses with internal courts or atria, off which opened the living rooms, for the richer members of the community. Still built largely of timber and mud brick, these houses cannot have had a long life but their forms have been preserved in other rock-cut tombs in the large cemeteries the Etruscans built outside their city walls. They had flat or sloping ceilings, sometimes coffered or elaborately carved, carved doorframes, and coloured dados around the walls. Roof and ceiling beams were given intermediate support in the larger tombs by columns which take a variety of forms, square, polygonal or circular in plan, sometimes fluted and with a variety of capitals including crudely cut Doric and Ionic. Some of the later tombs have atria with roofs sloping inward to a central opening to drain rain-water to a tank beneath.

Temples began to show Greek influence in having buildings within the enclosure to house the god or cult image. The original name for this structure was simply 'aedes' or building. The temple building bore a limited resemblance to the Greek temple: rectangular in plan, raised on a podium, and with a wider-spreading roof partly supported by outer columns. But there the resemblance to the contemporary Doric temple ended. There were several differences in plan arrangement and form:

1) The temple building was set at the back of the enclosure facing the entrance and had a blank rear wall. An open-air altar was retained on the axis between the front of the temple building and the entrance to the enclosure.
2) The axial arrangement was emphasised by raising the building on a podium considerably higher than the stylobate of the Greek temple and by providing entrance steps only at the front, facing the altar.
3) Usually, columns were employed only at the front of the building to assist in carrying the roof of the porch. Occasionally they were used at the sides also but were never carried round the whole periphery of the building.
4) The cella was a simple rectangular room, though it was not unusual for there to be three cellas side-by-side for a triad of gods. Where there was only one cella, there might be open wings at the sides, giving a



The Roman Empire

very similar plan. The proportions were much shallower than in Greece, making the whole structure more nearly square in plan.

Other differences in character stemmed from the fact that everything but the podium was built of timber, mud brick and terracotta. The use of these materials in place of marble or other stone gave rise to other differences in proportion and details. Wide roof overhangs were necessary to throw rain-water clear of mud-brick walls. Columns and architraves were more slender, even when protected by coverings of terracotta, and column spacings were wider. The type of detail to which terracotta lent itself was different from the finely cut detail of the Greek mason. In his subsequent attempt to codify what he saw as the ideal Etruscan form, Vitruvius described and specified a Tuscan order which bore some resemblance to the simplified Doric that tended to result. But the order was not really found as he described it until considerably later.

What is known of the earliest Etruscan towns shows that they were probably no more than products of natural growth. Evidence of conscious planning is first seen in temple layouts, but around 500 BC regular grid layouts appeared in new towns on fairly level sites. Cemeteries, to which even more care seems to have been devoted, display similar patterns, with regular layouts introduced rather later; reference has already been made to some of the tombs, of which large numbers survive. The earliest took the form of stone burial chambers concealed below conical tumuli. Most were simply cut into the rock and approached by descending stairs, unless it was possible to cut horizontally into a rock face, in which case they would be provided with a simple carved facade. As well as representing contemporary house forms, some of them were decorated with wall paintings of funeral rites and similar scenes.

In the larger towns, it appears that considerable attention was given to such matters as drainage, though the well-known principal sewer of Rome—the Cloaca Maxima—was for a long time merely an open drain over most of its length. The fine defensive walls of polygonal or ashlar masonry, which are now the principal remains of the early towns, date only from the period when Rome was gaining the ascendancy and good defence became increasingly necessary. Most of them are no earlier than the fourth century. Bridges at this time seem to have had simple timber spans, though the piers may sometimes have been of stone.

central posts, each 600 mm (2 ft) in diameter. It is assumed that both sets of posts had continuous lintels on which sloping rafters rested. These were overlaid by lighter horizontal members to which the roof covering, probably thatch, was attached. It has been conjectured that the roof construction at the apex took the form of a raised canopy which would have allowed smoke to escape from the building. The final group of post-holes defined an elaborate porch or entrance passage some 5 m (16 ft) long and over 2 m (7 ft) wide, and it may be that the house had a central loft. A number of related ancillary buildings and storage pits were excavated within the palisaded enclosure. Similar dwellings have been found at **Longbridge Deverill, Wiltshire**, and at **Pimperne, Dorset**, both in south-west England, at **West Brandon, County Durham**, in northern England, and at **West Plean**, Scotland.

### DRYSTONE HOUSES

**Chysauster**, in Cornwall in the extreme south-west of England (p.197N), has yielded exceptionally well-preserved and elaborate Iron Age drystone houses similar to those found in Scotland in the Neolithic period, but with open rather than roofed courtyards. The houses were strung out in two rows of four, set about 15 m (49 ft) apart. They were oval in plan and up to 27 m × 21 m (89 ft × 69 ft). Access was from the east into the courtyards, onto which three or more rooms opened. At the rear of each courtyard, opposite the entrance, was the main living room, usually paved, and anything up to 10 m (33 ft) in length. To the left of this was a roofed but open-fronted shelter, and to the right a long narrow room, possibly used for storage. Some of the houses had additional rooms; many had drains and external terraced areas which were probably garden plots.

In Scotland, drystone aisled-roundhouses and wheelhouses attained considerable internal complexity. The aisled-roundhouse at **Clettravel in the Outer Hebrides** (p.197P) was circular, 8.5 m (28 ft) in diameter internally and 14 m (46 ft) externally, and its walls had two leaves of drystone walling forming a cavity which was filled with turf and rubble. An upper gallery was supported on eight freestanding stone piers, which would have also supported a substantial roof. They also created an aisle around the circumference of the dwelling and extended it some 2 m (7 ft) from the side walls, leaving a double-height space at the centre. The wheelhouses at **Jarlshof** were circular in plan, 10 m to 12 m (33 ft to 39 ft) in diameter overall, with walls about 1 m (3 ft) thick. Internally they had radial walls tapering in plan towards the central space defining a number of compartments. These were roofed with stone slabs, the central area by means of corbelling. A similar house was found at **Clickhimin in the Shetland Isles** and at the **Calf of Eday, Orkney** (p.197L).

## *Funerary Monuments*

Funerary monuments and ritual structures ceased to be built during the Iron Age. Cult sites are of three kinds:

artificial shafts, such as that found at **Holzhausen** in Bavaria dating from the first century BC, and other ritual wells, sunk to depths of between 12 m (39 ft) and 40 m (130 ft), and containing deposits of animals, human bones and votive offerings;

small double-square temples, such as those excavated at **Heathrow**, England, and **Ecury-le-Repos and Fin D'Ecury in Marne**, France (*c.* 300–100 BC), in which ditch and earthwork enclosures, measuring about 10 m × 10 m (33 ft × 33 ft) in plan, surrounded post-holes for timber structures;

long parallel-sided rectilinear or elongated oval 'sanctuary sites' enclosed by ditches and earthworks, as at **Aulnay-aux-Planches, Marne**, France (*c.* 1100–1000 BC), and **Libenice**, Czechoslovakia (*c.* 300 BC), containing standing stones, post-holes and hearths. All speak of a rapidly evolving European civilisation and a developing pattern of settlements over a wide area.

## *Defensive Structures*

By contrast, fortifications, already well-established in central Europe during the Bronze Age, spread to north-west Europe to such an extent that from about 1000 BC onwards hill-forts became the commonest monument of the Celtic world, numbering at least 10,000 in Europe. Parapet construction varied from a simple sloping-fronted earthwork of triangular section with ditch and occasionally backed by stone revetting, as at Maiden Castle in south-west England (*c.* 100 BC), to a timber or drystone revetted form of construction, which presented a vertical face to the attacker. In more elaborate types of rampart, crenellations, breastworks, walkways and stepped-sections were found. Common in Iron Age Europe were box ramparts and timber-laced ramparts, in which stone-built fortification walls were reinforced with timbers. They were occasionally fired to vitrify and fuse the stones. In northern and western Scotland hill-forts were rare, but fortified buildings known as duns (small, stone-built, circular forts) and brochs (stone-built, circular towers) were common.

### HILL-FORTS

**Maiden Castle** (see above) illustrates a typical progression of building in the development of Iron Age hill-forts. The occupation of Maiden Castle took place in four phases. First, about 350 BC, the hill was ringed with a single rampart and ditch; this was faced with timbers and then built from chalk, quarried from an external ditch. At this stage it had gates at the east and west ends of the enclosure. About a century later, the eastern gate was elaborated by claw-like extensions which funnelled traffic into the entrance passages. At the same time, the fort was enlarged to take in areas to the west. In the third period (*c.* 150 BC) there was further enlargement of the ramparts, which were then reinforced with stone, and additional defences added at the entrances, which were further elaborated in the final phase (*c.* 100–75 BC).

### FORTIFIED BUILDINGS

Both a broch and a dun have been found at **Clickhimin** (p.207B) in the Shetland Isles, Scotland. The broch at Clickhimin was nearly 20 m (66 ft) across, with walls over 5 m (16 ft) thick at the base, enclosing a central court of about 10 m (33 ft) in diameter. The entrance passage was on the western side. From the entrance passage, narrow doorways gave access to two oval intra-mural chambers with corbelled roofs. Timber-galleried accommodation was built against the inside wall, giving access to a staircase which spiralled upwards within the thickness of the block wall to a rampart walk at the top of the tower. This is estimated to have been between 10 m (33 ft) and 15 m (49 ft) high. Similar well-preserved fortified buildings are to be found at **Mousa in the Shetland Islands**, and **Gurness** and **Midhowe in Orkney**. The dun was of similar size, with galleried accommodation built against the inner face, and doorways leading from the upper floor to a rampart wall. **Dun Kildalloig** and **Borgadel Water** on the Mull of Kintyre, Scotland, were comparable versions but had no galleries.

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with interiors than with exteriors, and the architecture of the country villa even sought to establish new relationships between the interior and the landscape; indeed it was in the design of the villa that the innovations were first seen. The interior had already assumed primary importance in the basilica as it had done in such buildings as the Greek bouleuterion and the audience halls or throne rooms of Achaemenid palaces, which might be regarded as being among its ancestors. But the interior did now become more widely important in a way that is epitomised by a comparison of Hadrian's Pantheon with the Athenian Parthenon. Whereas nearly all attention was given in the Parthenon to the exterior, the exterior of the Pantheon counts for little in relation to its vast domed interior. And this was, above all, an interior of a new kind, no longer bounded by four walls and a roof.

In this change, a central role was played by the dome, which both dissolved the distinction between wall and roof and furnished a means of covering large spaces without intermediate supports. Initially its use did impose a severe restriction on planning, but by expanding the space immediately beneath it in various ways, more freedom was gained. Further freedom came from the parallel development of large-scale vaults of other kinds. There was a further exploration of the relationships between spaces—of the ways in which they could be made to lead from one to another in calculated sequences.

Though the change was pioneered in the design of imperial villas and palaces, most people would have experienced the new architecture chiefly in the large public baths built by successive emperors in the capital. The earliest that now survive in a fairly complete state are those of Caracalla, but substantial remains of the baths of Trajan, and drawings by Palladio of the baths of Titus, show that the form was well established by the end of the first century AD. The uncompromising axial symmetry of these buildings (achieved to a large extent by duplicating many of the rooms that lay off the central axis) meant that there was less surprise in changing axes than in some of the late villas. Nevertheless, the sequence of different spaces opening off one another—some with groined vaults, some domed, some almost as overwhelming individually as the Pantheon, and others smaller and more readily comprehensible to give a greater sense of scale—must have created a deep impression.

Today, however, it is difficult to visualise fully what this impression would have been. Mostly we see only a ruined carcase. Even in the Pantheon, which has the best preserved interior, much has changed. And there has been even more change in that part of the baths of Diocletian converted into the church of S. Maria degli Angeli. We must try to visualise them with the same opulence of surface as was typical of the richest villas of the early Imperial period, with walls largely sheathed in coloured marbles, and vaults or ceilings richly gilded or decorated with paint or mosaic. The wall surfaces were far from flat; they were broken up, not by painted colonnades, but by attached columns of coloured marbles and by niches filled with classical statuary. When they were in use, the bath halls would have been further enlivened by colourful crowds, and perpetual streams of running water, issuing, perhaps, from the mouths of lions carved in marble or cast in bronze, and falling into marble basins.

The exteriors are even less well preserved. The decorative use of the orders referred to above continued in some types of structure, but it became less usual on buildings where the interior was of primary importance. The exterior was usually relatively plain and unadorned apart from a facing of stucco or marble. The Pantheon, for example, presented externally a completely unbroken wall surface apart from the portico; and the baths did likewise except to the extent that some of their wall surfaces were broken by rows of window openings which served to create another rhythm. Exteriors did sometimes, however, acquire a new plastic interest when they directly mirrored complex interior forms such as the projection of the circular space under a dome, or when they served as a direct communication between the interior and its landscape setting, as in the earlier portico villa.

In this architecture and its decorative detail it is also possible to detect what can best be described, by analogy with something very similar in the seventeenth century, as a Baroque trend. It resulted from the adoption of complex plan forms of continuously flowing curves and complex shapes of vault. A corresponding trend in decorative surface treatments had appeared already in Republican wall paintings, and it is seen a little later in actual construction in details such as broken pediments.

Alongside these developments, there were further changes in town planning and in housing. The beginning made by Augustus on the construction of a new forum in Rome was carried further, first by Nero and then, most notably, by Trajan, to give the related and unified sequence of large public spaces that extended almost from the Colosseum to the foot of the Capitol. As part of Trajan's contribution, Rome acquired both its largest basilica and its finest market complex. The Basilica Ulpia was, for its time, a fairly conventional structure in all but size. The adjacent market was not. It rose—and still rises—in numerous levels up the slope to the north of the forum, with several terraces and streets of shops, and two large and very different vaulted halls. The entire complex was conceived and built as a whole, using brick-faced concrete everywhere except in some heavily loaded piers.

The developments in mass housing were closely related to what is seen in the market, no doubt because the design and construction of the market were undertaken against the background of major changes in housing construction after the fire of AD 64. First, the opportunity was taken to replan large areas with straight broad streets, thereby creating rectangular blocks or insulae. In a further attempt to prevent similar fires in the future, the use of timber was virtually prohibited: principal walls and floors, at least, were made of concrete. Balconies or external porticoes were called for to facilitate fire-fighting. Today the resulting plan-form is best seen in the abandoned port town of Ostia, and an example will be described below. One feature which must be mentioned here, however, is the increasing use in these buildings of arcades in which the arches were carried on tall slender piers. In the courts of the houses of the more wealthy, arcades in which the arches were carried upon free-standing columns also made their appearance. Examples survive from *c.* 300 AD.

The final phases of architecture in the capital were marked by occasional revivals of earlier forms and introductions of others from the provinces, and by the construction of the last large basilica in the capital—the Basilica Nova, begun by Maxentius and completed by Constantine. This basilica was by far the most significant. It isolated as a completely self-sufficient structure the large rectangular groin-vaulted hall that had previously served as the central hall—the frigidarium—of the great bath complexes. It did so on an unprecedented scale. Its exterior owed virtually nothing to a top dressing of the orders. It derived almost all its interest from the pattern of fenestration, which reflected the interior to a greater extent than before. Though it was without direct issue, it is difficult not to see in it a foretaste of later achievements in the East.

## Architecture in the Provinces

As might be expected, the character of architecture in the provinces differed from that in Rome and Italy, in ways that reflected local resources, local traditions, and the differing requirements of climate, culture and religion. The differences were also more marked at some times than others.

In the West, where there was little local tradition or culture to match that of the Romans themselves, Roman forms were imported virtually unchanged by the new masters. Except in a few favoured places, they were scaled down. Buildings like the Maison Carrée and the amphitheatre in Nîmes, the theatre in Orange, and the Pont du Gard might just as well have been built at the same time in Rome or its vicinity. Where something new appeared, like a different temple form, it was in response to a different requirement. The chief lack in the western provinces up to the time of the tetrarchy is any real counterpart to the great Roman vaulted architecture.

In the East and in much of North Africa, there were long-established Hellenistic traditions which remained strong, and there was often no clearly discernible break with the architecture of pre-Roman times. Differences did nevertheless appear. One such difference is an increased emphasis on height in the temple. The great temples, such as the Temple of Jupiter at Baalbek, do not quite equal the largest Greek and Hellenistic temples in size, but they do exceed them in height. Again, where the requirements of local cults were different, there were forms not wholly inspired by Rome. There were a few counterparts, on a somewhat smaller scale, to the great vaulted architecture of the capital, but not outside the Balkans and Asia Minor. Climate here was possibly the principal reason. The chief monumental structures, after temples, were probably the theatres—always open to the sky apart from a projecting roof over the stage and an awning to give some further shade. The chief difference as compared with Rome in the later centuries was the long persistence of construction in cut stone, in much of Asia Minor, the whole of Syria, and most of North Africa. It was coupled with the persistence of related Hellenistic forms and a largely independent evolution of these towards something more Baroque in style.

Towards the end, in the time of the tetrarchy and afterwards, there was a trend towards greater uniformity throughout the empire, or at least as between the new provincial capitals where most new building was to be found. Today this is best seen in the architecture of Constantine's time in his capital, Trier, which differs in hardly anything but scale from that of Rome.

# Examples

## Etruscan and Early Roman

### *Sanctuaries and Temple Buildings*

The **Etruscan Temple** as described by Vitruvius (Bk IV chap vii) has already been referred to. He does not describe any particular structure, but lays down the proportions which he considers to be correct, basing them, presumably, on what he has seen of such temples as they existed in the late first century BC. The model shows a possible interpretation of his description in the light of surviving terracotta details and early burial-urn models (p.216A). Vitruvius specifies that the spaces alongside the central cella, each three-tenths of the total width, may be either secondary cellas or open wings. They are shown in the model as

## Late Republican and Early Imperial Roman

From the early second century BC, marked changes occurred. They were the result primarily of direct exposure to influences from the Hellenistic East and the already Hellenised Campagna, the exploitation of local travertine and tufa, and the import of foreign marbles. But in other directions the changes were stimulated and made possible by a growing mastery of the new concrete, and were evident not only in previously existing types of building—temples and dwelling houses—but also in the introduction of many new types such as public baths, basilicas, and places of public entertainment.

Architecturally, the changes might be summarised as the introduction of new proportions relating to the use of different materials; the adoption of the Classical Greek orders, particularly the Corinthian; the combination of these orders with an arched form of construction; and the widespread use of vaulted and domed forms.

The first two types of change are most evident in temple buildings, where conservatism usually resulted in the retention of earlier plan forms. Republican and early Imperial temples were still set on high podia, approached only from the front up flights of steps—which were now flanked by massive low walls, projecting forward from the podia and serving as bases for statuary. Usually they still had simple rectangular cellas preceded by columned porticoes, and sometimes had columns or attached half-columns along the sides, but less frequently around the back. They were still roofed in timber, sometimes with suspended coffered ceilings. But the use of stone for the columns and architraves resulted in closer spacings of the columns, and its use also for the cella walls removed the need for such large roof overhangs. All three Greek orders were used in temples of the second and early first century BC, but the proportions of the Roman Doric are noticeably more slender than those of its Greek prototype. The only exception to the traditional Italian rectangular plan was the occasional adoption of the Greek circular plan, usually with little change from the prototype.

It was usual to site an important temple building in a commanding position in relation to the city forum, unless it was still isolated in its own precinct. In the former case, the altar was set immediately in front of the entrance steps or even set into them. The latter arrangement emphasised still further the axial planning of Roman temple buildings. The outstanding examples are the Temples of Fortuna Primigenia at Palestrina and of Hercules Victor at Tivoli, where the rectangular precincts are surrounded by colonnaded rows of shops and the temples are approached by semicircular flights of steps which served also as seating for theatrical performances.

The forum, corresponding to the Greek agora, was originally an irregularly shaped open space serving as market, general meeting place, and the setting for political discussions and demonstrations. Even in late Republican times it might still be a multi-purpose space, hemmed in by unplanned groups of dwellings, shops and workshops. But it was usually a more formal rectangle, closed at one end by a temple, whose extended temenos or sacred enclosure it effectively became. On other sides it would be largely surrounded by colonnades and public buildings, usually including markets and a basilica.

It is in some of these and other public buildings that the characteristically Roman combination of the orders with the arch made its appearance, though there is some evidence (notably a representation on a funerary urn of uncertain date from Chiusi) that tentative experiments may have been made a little earlier. The combination presumably came about because of the lack of suitable stone for wide-spanning lintels when stone replaced timber as the principal structural material. Openings, where needed, were made narrower, and were spanned by arches. Half-columns were then placed in front of the wall containing the openings, and the semblance of an entablature was constructed between them and above the arch by means of blocks of stone projecting forwards from the wall. The arched openings in the wall were framed by the columns and entablature, and the order became purely—or at least primarily—applied surface decoration.

The arch and vault had already been exploited more openly in a variety of more utilitarian buildings such as warehouses, and in various substructures. They appeared most frequently as a sequence of barrel-vaulted bays, set side-by-side as in the much earlier brick-vaulted storerooms of the Ramesseum at Thebes. Similar vaulted bays, slightly tapered in plan, served to support the seating of early theatres. To a more limited extent, the dome also was used, chiefly over the frigidaria of public baths.

The basilica was one of the first large-scale Roman building types in which the interior took precedence over the exterior. It was, in one sense, a small enclosed forum surrounded by its own colonnades or stoas. Its central space, usually rectangular like the forum, had a trussed timber roof and was open at the sides to lower aisles behind the colonnades. Light frequently came from clerestory windows above the colonnades, and there might be side galleries above the aisles. One of its more specialised uses was for the dispensing of justice, for which purpose there was often an apse opening off the centre of one side or off one end of the central rectangle. The best preserved early basilica is that in Pompeii, which may indicate that the form came to Rome from Campagna.

Be this as it may, there is no doubt that buildings like public baths and theatres first appeared in this coastal region around Naples that had not only been exposed to Greek influence for much longer but also, at Baia, possessed natural hot-water springs.

As compared with its Greek counterpart, the theatre differed chiefly in that it was usually constructed on level ground instead of having its seating set in a natural bowl. Seating was restricted to a semicircle, and a raised stage set in front of it was backed by a tall structure extending from one side of the auditorium to the other. The amphitheatre was similar in construction. But, as its name implies, it was theatre-in-the-round, with its seating completely encompassing the central arena. Because of their construction, both theatre and amphitheatre rose prominently from their surroundings. The baths had no direct Greek counterpart. They consisted originally of a series of rooms of very different forms reflecting their uses in the bathing sequence, which progressed from a cold plunge to a warm room and then a hot room. The rooms were compactly grouped together, seemingly without any attempt at first to produce an architecturally meaningful ensemble.

The self-indulgence manifest in these buildings was also first reflected in domestic architecture in the southern region, and the chance preservation of many examples by the eruption of Vesuvius in AD 79 has left an excellent picture of the new luxury of the houses of the more wealthy. The atrium was still entered through a passage in an otherwise blank street facade, unless the rooms to either side of it were let off as shops, but it was now sometimes two-storey instead of single-storey as before. Beyond it opened another court, always unroofed and used as a garden. This was surrounded by colonnades (for which reason it was called the peristyle), and by the more private living rooms. In the country and on sites facing the sea, where there was less need for privacy and a good view of the surrounding landscape, a more open plan was adopted—that of the so-called portico villa, portrayed in numerous wall paintings of the period. Here, the principal rooms were strung out in line to enjoy the view and were faced with colonnades or porticoes on one or two storeys.

It was in these houses and villas that the first extensive use seems to have been made of imported marbles for columns and other exposed structural items and, in sheets little more than 10 mm (nearly ½ in) thick, for wall facings and for paving. Marble column-shafts were usually unfluted monoliths, polished to show the veining to best advantage. The alternative treatment for walls was painted fresco decoration applied to several successive coats of stucco.

Different styles of painting succeeded one another over a period of some two centuries. The first simply imitated coloured marble. Architecturally the most interesting is the second, which dated from the early first century BC to a little after the middle of the same century. Paintings represented extensions of the interiors and dissolved the solid walls into open colonnades similar to those which surrounded the peristyle courts. Among the usual straight entablatures, arches carried directly on free-standing columns rather than piers also appear in the paintings. The earliest surviving built examples of this style, which was subsequently to become of great importance, are in a vestibule of the Suburban Baths of Herculaneum, built about a century later. But it was a structural arrangement whose early experimental uses are less likely than most to have survived to the present day. In the later styles of painting, architectural forms become more and more attenuated and increasingly fantastic. In these villas, there were also many pieces of classical sculpture imported from Greece.

The mass of population was, of course, very differently housed. In Rome itself there was already, in later Republican times, considerable congestion in the central district around the forum. People were packed in crowded tenements several storeys high and constructed with timber frames and mud-brick walls. Fire and structural collapse seem to have been common until the great fire of AD 64 led to rebuilding in a more substantial manner.

Finally it was during this period that the most extensive public works of another kind were undertaken or begun, namely the building of roads, bridges, aqueducts, defence walls for new towns in frontier areas, and other facilities needed by a large empire and large concentrations of people. Amongst these works bridges, elevated sections of aqueducts, and gateways are of architectural interest. The bridges and aqueducts included some of the major achievements of Roman engineers, who were quite familiar with the possibility of piping water down into a valley and then up again on the far side, but had difficulty in making and maintaining lead pipes able to withstand the pressures that were generated at the foot of a dip, and therefore preferred the aqueducts to be open channels with a consistent slight downward fall to the distribution reservoirs. Both the bridges and the elevated sections of aqueducts were now superbly built of cut stone in simple arched forms which were usually left to speak for themselves but were occasionally given a more decorative surface treatment.

## Later Imperial Roman

The principal innovations of the next century—broadly from the reign of Nero to that of Hadrian (AD 54–138)—were in spatial planning, and were made possible by the complete mastery of concrete for vaulting.

It would be an exaggeration to say that an architecture of the interior began at this time. The domestic architecture just described was more concerned secondary cellas. A surprising feature is the extent of the projection of the pediment in front of the columns of the porch, but this is supported by some independent evidence.

Of the considerable number of temples that have now been excavated, the plans of some conform to his specifications, whereas others have substantially different plans. Indeed the specified cella widths could not have been generally applicable. Nor could the specified numbers of columns or the rule that the height of the column should be one-third of the width of the temple. This is because the size and spanning limitations of timber columns and beams would have called for proportionately lower heights and narrower widths, and for more columns, as the overall plan dimensions increased.

The remains of the **'Ara della Regina' Temple, Tarquinia**, provide one example of a different plan. This temple had a single cella and side wings. But its length of 77.5 m (254 ft) was more than twice its width rather than only a fifth greater, and it must have differed also in other respects.

The plans of the **Portonaccio Temple, Veii,** and the **Belvedere Temple, Orvieto** (fifth century BC), were closer to the Vitruvian proportions. The second of these had a wall that extended laterally to each side of the porch, and then forwards, to enclose a rectangular area in front. A large temple at **Falerii** (fourth or third century BC) with three cellas was built against the rear wall of a similar enclosure, the rear wall now serving also as the rear wall of the cellas.

The **Capitoline Temple, Rome** (end of the sixth century BC), dedicated to Jupiter, Juno and Minerva, and also called the **Temple of Jupiter Optimus Maximus**, was the largest Etruscan temple now known. There were three cellas dedicated to the three gods, a rear wall that projected beyond them, side colonnades enclosing wings alongside the outer cellas, and three rows of six columns each to support the roof of a porch equal in depth to the cellas. The podium, constructed of cut stone (and still surviving in part), was about 4 m (13 ft) high and 62 m long × 53 m wide (204 ft × 175 ft), close to Vitruvian proportion and rivalling in width the largest Greek temples. Though the temple was burnt in 83 BC, such was the importance attached to it that it was apparently rebuilt to virtually the same plan. According to Pliny, however, it was rebuilt with marble columns brought from the Olympeion in Athens, not timber columns. On the basis of those still remaining, the columns would have been almost 17 m (56 ft) high, which is higher than seems likely in the original temple. The fact that this height is equally close to the Vitruvian proportion suggests that this reconstructed temple may have been his chief model—though, having in mind the usual construction of temples of more modest size, he specified fewer columns, ignored the colonnaded wings, and called for greater eaves overhangs than would have been practicable on this scale.

## *Cemeteries and Tombs*

The earliest tombs were partly cut into the rock and then roofed by means of oversailing courses of flat-bedded stone, as in many other examples of early stone construction, from the galleries of the Mycenean fortress at Tiryns to the porticoes and internal stairs at Mayan sites like Tikal (q.v.). The **Regolini Galassi tomb, Cerveteri** (*c.* 650 BC), has two long rectangular chambers roofed in this manner. A tomb from **Casal Marittomo** (now rebuilt in the Archaeological Museum, Florence) and others at **Quinto Fiorentino** (all *c.* 600 BC) have circular chambers similarly roofed. They are on a much smaller scale than the great Mycenean tholos tombs, having diameters not exceeding 5 m (16 ft); even so, they have central piers to help support the crown of the vault. Also, the insides of the blocks of stone were not cut away to give a smooth continuous surface as they were at Mycenae.

The biggest concentration of rock-cut tombs, whose interiors resemble the interiors of the larger houses of the time, is to be found in the **Banditaccia Cemetery, Cerveteri**, many of them in groups surmounted by large conical tumuli of earth retained by low outer walls of stone (p.218A). Among them are the **Tomb of the Cornice** (fifth century BC) (p.219A) and the **Tomb of the Reliefs** (fourth century BC) (p.219B). The latter is so named because the walls and pillars are decorated with carved reliefs of household utensils, furniture, weapons, and other personal possessions associated with daily life.

The extensive necropolis at **Tarquinia** is chiefly notable for the large number of rock-cut tombs which retain on their walls paintings of daily life and of funeral rites and banquets. These tombs are mostly simple rectangular chambers of limited architectural interest. But one later tomb, the **Mercareccia Tomb** (possibly third century BC), has an outer chamber with a timber roof sloping to a central opening which reproduces the atrium of a house of the time as described by Vitruvius. Around the walls are friezes of carved reliefs, now in a relatively poor state of preservation.

## *Houses*

N.003

The **House of the Surgeon, Pompeii** (fourth to third century BC), must have been one of the larger houses of its time in this southern region, and was more solidly built than the houses of Etruria. An almost square atrium stands in the middle and was entered by a relatively narrow passageway from the street which was subsequently flanked by shops. Off the atrium, and facing the entrance, were the principal reception rooms, and other rooms opened off each side. In the centre of the atrium, beneath an opening in the roof, there was a pool.

the traditional Roman cella, fronted by a deep porch and looking out in one direction only from its high podium, there were two cellas, back-to-back, dedicated respectively to Venus, mythical ancestress of the Roman people, and to Rome itself. In place of just a columnar porch—or two such porches—there was now a colonnade that surrounded the double cellas on all sides, with ten columns across each front and twenty along each side. And, in place of the high podium, the whole temple was set on a low platform surrounded by steps. Next to this, and a little distance from it, were further colonnades on the two long sides. A fire destroyed the timber roof in 283, and a major rebuilding followed, as will be described later.

The so-called **Temple of Diana, Nîmes** (*c.* AD 130) (p.238A–F), was a pavilion, the precise function of which has not been determined, in the sanctuary of the local water god Nemausus, after whom the town is named. It is constructed wholly of fine ashlar, and is architecturally important as the best surviving example of a type of structure that reappeared, with virtually no change, in the Romanesque buildings of this region of France. The central barrel-vault, semicircular in profile, was stiffened at regular intervals by ribs projecting downwards, and its thrusts were partly carried over to the outer walls of side passageways.

At Nîmes, the temple itself has disappeared. The so-called **Temple of Janus, Autun** (p.237B), is less well preserved, but it serves to illustrate one of the types built to meet the needs of conquered peoples. The setting did not differ greatly in overall character from that of the earlier sanctuaries already described. The temple itself usually had a tall cella—square, circular, or octagonal—and, around this, a portico with a sloping lean-to roof on all sides. At Autun, only the square cella remains.

## *Forums, Basilicas, and Related Structures*

The **Forum, Basilica, and Market of Trajan, Rome** (*c.* AD 100–112) (p.223A), designed by Apollodorus of Damascus, were among the principal monuments of this age. The more conventional basilica was possibly the most highly esteemed of all Roman buildings in the following centuries, and the market showed off admirably the new concrete architecture then coming to the fore and contrasting sharply with the earlier type of market described above.

There were very close similarities with the nearby **Forum of Augustus**, to which Trajan's Forum was also related spatially. Its equally dominant central axis was set exactly at right angles to that of the earlier forum. As before, the forum had colonnaded porticoes on each side, beyond which opened semicircular courts, and even their architectural detail was similar. The chief differences were at the far end where, instead of the forum leading directly to the temple, the basilica was interposed; behind this, there was a monumental column (described below) flanked by two identical library blocks. The market rose up the slope of the Quirinal hill to the north, though this would hardly have been seen from the forum, as it would have been shut off by the northern boundary wall. To create the level area needed for forum, basilica, libraries, and temple, vast quantities of earth were cut away from the slope of the hill.

The basilica, known as the **Basilica Ulpia** (pp.240A, 241B), was set transversely over the full 120 m (400 ft) width of the forum, and consisted of a huge rectangular nave, 25 m (80 ft) wide, surrounded on all sides by double colonnades, and extended beyond the end colonnades by two semicircular apses with attached orders for internal decoration.

There were probably galleries over one or both of the aisles created by the colonnades, and there must have been a trussed timber roof over the central nave; its span was almost identical with that of the fourth century basilica of S. Peter's, so that it could have served as the model for that roof. The ceiling is known to have been sheathed with gilded bronze, while the walls were covered with multi-coloured marbles.

The **Market** (p.241C,D,E) consisted largely of many shops of the standard form, which consisted of little more than a vaulted rectangular room, open to the front, and tall enough to take a timber mezzanine floor. The shops were disposed along straight and curved streets on different levels which followed, at the foot, the curve of the northern boundary wall of the forum and at higher levels were adapted to the contours of the hill. But at the highest level there was a large tall hall with a series of groined vaults, structurally rather like the tepidaria of the Imperial baths (p.241C). Other shops opened off this, and it presented a four-storey facade—with balconies at an intermediate level—to the street which ran, lower down, past its western side (p.241E).

Though little remains of the libraries behind the basilica, the **Library of Celsus, Ephesus** (AD 117–120) (p.237C), is much better preserved and its facade has recently been reconstructed. It is a rectangular building, wider than deep and measuring approximately 17 m × 11 m (55 ft × 36 ft). Internally there were shallow square-backed recesses for the books or scrolls at three levels and narrow galleries carried on closely spaced columns for access to them. A further feature was that the walls containing these recesses were not the outer walls. There were other walls separated by a narrow ambulatory to accommodate the stairs to the galleries and to give added protection—almost an early example of cavity construction. The facade was embellished with two storeys of columned aedicules, pairs of columns carrying flat entablatures in the first storey, and different pairs carrying alternately curved and triangular pediments in the top storey.

### *Bridges*

The **Pons Sublicius, Rome**, was the first recorded crossing of the Tiber, and has been attributed to the Etruscan king Ancus Marcius. As its name indicates, it was a timber-piled structure, perhaps like that which Caesar later described as having been built over the Rhine during one of his campaigns. Though several times rebuilt, nothing remains of it.

### *Defence Walls and Gateways*

The **Wall** and so-called **Porta Saracena, Segni** (probably fourth century BC) (p.220A), are fine early examples of the fortifications constructed during the period when Rome was challenging seriously Etruscan power. Segni is in the limestone region to the south-east of Rome, so the wall is of fine large-scale polygonal masonry, and the gateway, with an opening at the foot of about 3 m (10 ft), has typical inward-sloping sides to reduce the gap at the top to one that could be spanned by a single stone lintel. Similar walls survive also at other Etruscan sites such as **Fiesole** (third century BC).

Surviving stretches of the final Etruscan **Defence Wall, Volterra** (fourth century BC), are constructed of roughly squared local stone. At one of the principal entrances are the original piers forming the two sides of the present **Porta all'Archo** (p.218B). The arch, as noted above, is clearly a later reconstruction, probably dating only from the first century BC. It has voussoirs of a different stone. But it incorporates badly weathered carved heads which seem to be Etruscan and may have come from an earlier arch. The **Porta Marzia** and the **Arch of Augustus, Perugia**, are also of post-Etruscan date in their present form.

The **Defence Wall, Falerii Novi** (latter part of the third century BC), was constructed when the previous Faliscan city of Falerii was destroyed by the Romans in 241 BC and a new one was built to replace it on level ground some distance away. The wall is built of blocks of squared tufa, and is chiefly notable for the fine arched **Porta di Giove** (p.220B) of the same date. This is probably the earliest extant stone voussoir arch in Italy. The unusually deep voussoirs are cut from tufa from a source different to that used for the wall. They rest on an impost moulding, and there is a similar moulding running around their outer curve, with a small head of Jupiter projecting from it above the keystone.

## Late Republican and Early Imperial Roman

### *Sanctuaries, Forums and Temple Buildings*

It has been seen that some Roman temple buildings were set in their own sanctuary precincts and others at the head of a forum. The distinction between these settings is not a sharp one because the sanctuary precinct was no more reserved solely for religious ceremonial than was the forum, though the non-religious uses did differ. It is therefore convenient to consider temple buildings in both settings together.

The **Sanctuary and Temple of Fortuna Primigenia, Palestrina** (perhaps late second century BC, but probably *c.* 80 BC), is the finest Republican example of this form. In an earlier example at **Gabii** (between Palestrina and Rome) the temple was set in a large rectangular precinct on fairly level ground. This precinct was flanked on both sides by rows of shops and had a theatre stage and stepped seating facing the centrally placed temple; in a later example at **Tivoli** (*c.* 50 BC) there was a similar arrangement in which the whole precinct was a large level platform raised on vaulted substructures on a hillside. At **Palestrina**, however, the sanctuary is constructed on several terraces that rise up a steeper hillside above the basilica and curia, though without any direct interconnection with them. There are seven terraces in all, most of them connected by steep flights of steps, but the third and fourth by long ramps that climb from each side to meet in the centre. The fifth and sixth terraces are faced by porticoes which once contained shops, and the sixth terrace—much deeper than the narrow ones below it—had porticoes at both sides as well as at the rear. In the centre of the rear porticoes, a flight of steps leads to the small semicircular top terrace. This served as the orchestra for the theatre, and was surrounded by stepped seating, much as in a Greek theatre. Finally, at the top of the seating, a semicircular, double portico framed a round temple, which was the climax of the whole grand composition.

The so-called **Temple of Hercules, Cori** (late second century BC) (p.218C), also standing on a commanding hillside site, is an example of early Republican Doric. There is a single cella preceded by a deep porch with four columns at the front and two additional columns at each side—a fairly normal plan for an Etruscan or early Roman temple smaller in scale than those Vitruvius had in mind. Though the order has been Hellenised, the elongated proportions, reminiscent of timber construction, could never be mistaken for the native Greek Doric. The steps in front of the podium have disappeared.

The so-called **Temple of Fortuna Virilis, Rome** (late second century BC) (p.216B), is a corresponding and much better preserved example of Hellenised re-interpretation of a similar earlier form, adopting the Ionic in place of the Doric. Here, attached half-columns continue the order around the sides of the cella.

The **Maison Carrée, Nîmes** (AD 1–10) (p.222A–C), perhaps the best preserved of all Roman temples, is a third and later example, now using the Corinthian order. Technically, it is a pseudo-peripteral pro-style hexastyle, meaning that it is like the so-called temple internally, presumably to carry a timber roof. It is not clear whether there were galleries above the aisles. There was an open colonnade at the end adjacent to the forum, so that the interior communicated directly with it.

The **Basilica Aemilia** and **Basilica Julia, Rome**, were corresponding early Roman examples. The Basilica Aemilia was the earlier of the two, but little remains of the original structure erected in *c.* 179 BC. It was restored in 78 BC and then rebuilt in 55–34 BC. A coin issued before this rebuilding shows a two-storey colonnaded elevation, the upper storey being of less height than the ground storey. The structure was again a rectangular hall some 90 m long × 27 m wide (300 ft × 90 ft). The Basilica Julia, begun by Julius Caesar, damaged by fire in *c.* 12 BC, rebuilt and rededicated by Augustus in AD 12, and twice again restored in 305 and 416, was substantially larger, being 105 m long × 45 m wide (345 ft × 150 ft). Structurally it consisted of three ranges of two-storey arcades carried on rectangular piers around both short sides and one of the longer sides, and of two such ranges on the remaining long side, behind which was a row of shops. The other long side was open to the adjacent forum and the two short sides were also open. The double aisles thus formed on all sides were vaulted, while the relatively narrow central space had the usual timber roof. As in Pompeii, there was no apse in either structure. It appears that, in the Basilica Julia, parts of the central space were curtained-off as required for court use.

The Basilica Julia shows one early instance of the characteristically Roman combination of the arch with an applied decorative use of the orders, and the nearby **Tabularium, Rome** (78 BC), was the first example of the combination to have survived. It was built as the public record office, and its facade towards the Roman Forum still forms part of the front of the present Palazzo Senatorio on the Capitol.

The **Market, Leptis Magna** (*c.* 8 BC and AD 31–7), is an early example of a common form. A large rectangular court is surrounded by porticoes. In the centre are two arcaded circular pavilions surrounded by octagonal colonnades with flat entablatures. Some later examples, for instance at Pompeii and Pozzuoli, have only a single pavilion.

## *Balneae and Thermae*

VI.02

The **Stabian Baths** (second century BC, partly remodelled early first century BC) and **Forum Baths** (*c.* 80 BC), **Pompeii**, are the earliest public baths which combine the bath proper with an exercise yard or palestra. Both consisted of separate baths for men and women, with separate entrances. In each of these a vestibule led first into a changing room (apodyterium). Opening off this were the cold bath (frigidarium) and the warm room (tepidarium). Finally, the warm room led to the hot room (caldarium). The rooms varied in shape and size, both according to function and between one group of users and another. Those for the men were architecturally more distinguished; their frigidaria were circular in plan, with small niches around the circumference, and were roofed with the first known examples of concrete domes. In addition to these rooms there were small private baths, latrines, and so on. In the final development of the Stabian Baths, there was a natatio or swimming pool directly open to the palestra.

The overall planning seems to have aimed only at making the fullest use of the available area consistent with convenience and servicing. The men's and women's caldaria were placed, for instance, on opposite sides of a single central furnace—though heating in the Stabian Baths was originally by brazier, and not by the underfloor hot-air system that was introduced early in the first century BC. Apart from the fact that in both establishments all the principal rooms were arranged around the palestra and were surrounded externally by corridors or shops, there was little in common between the two plans. As the street frontages were largely given over to shops, there was little to indicate externally the function of the establishments.

All the rooms of these baths were of quite modest size, with widths or diameters not much more than 5 m (17 ft) and lengths not more than 20 m (68 ft). In the **Baths at Baia**, drawing on natural hot water springs like those at Bath in England, several much larger domed halls were built. The earliest of these, the so-called **Temple of Mercury**, is the best preserved. It has an internal diameter of 21.5 m (71 ft), almost half that of the Pantheon, and appears to date from the latter part of the first century BC.

The **Baths of Agrippa, Rome** (late first century BC), were the first in the capital. They were destroyed in a great fire in AD 80, but it is clear that they were on a considerable scale and, like those at Baia, more openly planned than the early baths in Pompeii, being set among gardens with porticoes and an artificial lake.

## *Theatres*

VI.03

The **Large Theatre, Pompeii** (second century BC, enlarged subsequently), is the oldest theatre of Roman construction in Italy. It has a form intermediate between that of the Greek theatre and that of later Roman theatres, with the seating set partly in a natural bowl in the ground and surrounding the horseshoe-shaped orchestra.

The **Theatre of Marcellus, Rome** (23–13 BC) (pp.224B, 226A), was the first permanent one in the capital. It was built on level ground near the Tiber, with all the seating raised on arcaded and vaulted of Fortuna Virilis in having attached half-columns around the cella. But it has six columns across the front of the porch, whereas the latter had only four. The details, which include a rich entablature and an early instance of a cornice with modillions, bear a close resemblance to those of the Temple of Mars Ultor (referred to below) and suggest that the construction was undertaken partly by craftsmen sent from Rome. Originally the temple stood on its podium within a forum surrounded by porticoes.

The round **Temple of Vesta, Tivoli** (early first century BC), on the other hand, was a pure Greek import except for its podium, the fact that it has steps leading up to the cella only on the axis of the entrance, and the manner of construction. The walls of the cella were constructed largely of opus incertum. There were eighteen Corinthian columns 7 m (23 ft) high and, above them, a frieze decorated with ox heads linked by festoons. The capitals have, unusually, a large six-petalled flower on each face and the leaves are derived from a crinkly variety of the 'acanthus mollis'.

The **Round Temple on the Forum Boarium, Rome** (first century BC) (p.216B), is generally similar, slightly larger, and more complete, though it underwent repairs in later Imperial times and has lost its entablature. It is constructed of Parian marble, including the cella walls, and has twenty Corinthian columns 10.5 m (34 ft) high. The cutting of the capitals suggests Greek workmanship. As at Tivoli, there is no evidence for the original roofing: it was probably of timber like that of contemporary rectangular temples.

The **Forum of Caesar and the Temple of Venus Genatrix, Rome** (commenced 51 BC, dedicated 46 BC and finally completed under Augustus) (p.223A), were part of the first attempt to give the heart of Rome a more formal and worthy character. The long rectangular forum was flanked by double colonnades with shops behind them and had the temple (dedicated to Caesar's divine ancestress) at its head.

**The Rostra Augusti, Rome,** was the speakers' platform on the old forum, rebuilt by Caesar in 44 BC and completed by Augustus. It was used as a place for displaying the prows of captured ships, and it was from these that it took its name. Some of the prows were on the wall below the platform and others were mounted on commemorative columns. There were further columns supporting statues.

**The Forum of Augustus and the Temple of Mars Ultor, Rome** (late first century BC to early first century AD—dedicated but incomplete in AD 2) (pp.223, 224A), continued the remodelling of the central area begun by Caesar. The forum was laid out at right angles to that of Caesar, with the temple again at its head but now on a somewhat larger scale. The site was not quite symmetrical, apparently because of difficulties in land acquisition. But the plan has a very strong axial emphasis, and the lack of symmetry was so skilfully disguised that it would never have been apparent except on close inspection of the side porticoes. (A Greek architect would have been more likely to have turned the lack of symmetry to account in his plan rather than hiding it.) The colonnaded porticoes had entablatures borne by caryatids, and from each portico a large, almost semicircular courtyard was placed in line with the broad flight of steps leading up to the temple. Near the foot of the steps (but not shown in the reconstruction drawing) was the centrally placed altar. The temple itself (p.224A) had a single, almost square, cella with an apsidal recess at its far end—an early instance of this feature in a building of this type—and internal columns and pilasters to reduce the roof span. The cella was flanked by relatively narrow wings that were formed by continuing the outermost lines of columns of the deep porch along its sides. The porch itself was octastyle. Construction of the walls of the cella and the outer walls of the forum was of peperino stone, faced with thin slabs of Luna marble which were tied back at intervals in the height by solid marble bonding courses. The podium was faced with thicker slabs of marble and the Corinthian columns, 17.5 m (58 ft) high, were also of marble.

The temple was dedicated to Mars the Avenger, having been vowed at the battle of Philippi in 42 BC which avenged Caesar's murder. But it is clear, from what is known of the statuary which originally adorned both temple and forum, that the whole project was also a public assertion of the achievements of Rome and of Augustus himself and his house. Today this is doubly difficult to appreciate. Not only has the statuary gone, but almost half the forum is now buried beneath the broad Via dei Fori Imperiali; of the rest, only the rear wall, parts of the curving walls of the semicircular courtyards, the podium and steps of the temple, and a few of the columns remain. In its day it was one of the chief bases for the claim of Augustus to have 'found Rome a city of brick and left it a city of marble'.

## *Basilicas and Related Structures*

√ [illegible]

The **Basilica, Pompeii** (second century BC), stands towards the opposite end of the forum to the temple. But whereas the temple looked down the length of the forum, as did the last two Roman temples just described, the basilica was aligned at right angles to one of the longer sides. The structure was damaged in the earthquake of AD 62 and had not yet been restored when Vesuvius erupted 18 years later. It is, therefore, a very early example of the basilica form. It is a rectangular hall about 62 m (205 ft) long and 25 m (80 ft) wide, without any apse but with a projecting tribunal at the far end. A single order of tall Ionic columns (here made of brick) ran round all sides to the Etruscan tumulus for its basic form, though it broke the long-standing rule forbidding burial inside the city. Like the later Mausoleum of Hadrian, it had as its base a huge cylinder, 88 m (290 ft) in diameter. The outer wall was constructed of concrete, faced with travertine opus quadratum. Behind this, a complex system of four circumferential and numerous radial walls, similarly constructed of concrete but now mostly faced with opus reticulatum, divided the interior into concentric compartments, though, apart from the sepulchral chamber and the passages leading to it, these compartments were simply filled with earth. They supported a final mound of earth planted with evergreen trees at a height of 44 m (145 ft) above the ground, and the central core was surmounted by a bronze effigy of Augustus. The surroundings were landscaped with further trees. The first burial was in 23 BC and the last—that of the emperor Nerva—in AD 98. The structure was converted to a fortress in the twelfth century and more recently served a variety of other uses, including that of a concert hall. It is now an empty shell.

The **Tomb of Caecilia Metella, Rome** (*c.* 20 BC) (p.229C), on the Via Appia, is a smaller building of the same type. It has a podium 30 m (100 ft) square, above which rises the main cylindrical structure (only slightly smaller in diameter), in the centre of which was the tomb chamber—the sarcophagus from which is now in the Palazzo Farnese. The exterior was again faced with travertine and carried an entablature with a frieze decorated with ox skulls and festoons.

The **Pyramid of Cestius, Rome** (*c.* 12 BC) (p.229B), on the Via Ostiensis, revived a much older form. It is constructed of concrete faced with white marble. Inside the pyramid the vault and walls of the tomb chamber were decorated with figure paintings.

## *Houses and Villas*

The **House of Pansa, Pompeii** (second century BC) (p.230A,B), represents the large fully developed family mansion which occupied with its garden a whole city block or insula. It comprises two main portions: the atrium at the front, which served for formal occasions as well as normal use; and the peristyle at the rear, which was for more private activities. Earlier, as in the House of the Surgeon, the atrium constituted the entire house; the addition of a colonnaded peristyle became common from the second century onwards.

A measure of privacy was ensured even in the atrium portion of the house, since nearly all the rooms faced inwards—being lit, in the absence of window glass, through tall doorways which were closed either by curtains or by doors with metal grilles. The atrium itself contained the shrine of the family gods, and near to the impluvium (the water tank beneath the opening in the roof) stood a marble table, a traditional survival of the ancient banqueting board. An open living room or tablinium was curtained off between the atrium and the peristyle, and was flanked on one side by a passageway. The peristyle, with sixteen marble Ionic columns supporting the inner margins of its roof, was laid out with flower beds and graced with statuary, fountains and water basins. Bedrooms or cubicula, dining rooms or triclinia (so-called from the three couches provided against the walls for the host and his guests) with different aspects for summer and winter, a reception room or oecus, and wings for informal conversation, surrounded it. The rooms had mosaic floors, and the walls were covered with fresco paintings. Furthest from the entrance, but with convenient access from the side street, were a kitchen and pantry. There were smaller upper rooms around both atrium and peristyle. Most of the separate houses and shops shown on the two long sides resulted from modifications by a later owner.

The **House of the Faun, Pompeii** (also second century BC), was an even more splendid house of similar character, from which came not only the delightful bronze of a dancing faun from which the present name derives but also the superb floor mosaic of the Battle of Alexander against the Persians, now in the National Museum, Naples. The house includes a further innovation of this time, namely the introduction of four columns in the atrium to support the margins of the opening in the centre of the roof.

The **House of Livia,** on the Palatine in Rome (mid-first century BC), was probably occupied by Augustus after he became emperor, and might thus be regarded as the first imperial palace. As far as it has yet been excavated, it is a modest structure compared with the two earlier Pompeian houses just described—more like the even earlier House of the Surgeon, with its atrium with the reception rooms opening off it. The walls were frescoed in contemporary styles.

## *Aqueducts and Bridges*

Numerous aqueducts were built to supply Rome with water from the late fourth century BC onwards, but neither before nor after the period under review did the elevated sections of any of them approach in magnificence the **Pont du Gard**, near **Nîmes** (late first century BC or early first century AD). The aqueduct was constructed to bring water from near Uzès to Nîmes, and it was carried almost 50 m (160 ft) above the deep valley of the river Gard on three tiers of arches. The lower two tiers correspond closely to one another, with the widest span of 24 m (80 ft) in the centre over the water. The arches are 6 m (20 ft) wide, and were constructed in three identical parallel rings from large blocks of stone pre-cut to fit exactly. Projecting blocks on the piers served to support the substructures which ingeniously incorporated radially aligned ramps and circumferential corridors to provide access to it. The tiers of seating were now semicircular, and the stage ran from side to side in front of it, backed by a tall enclosing wall. Externally the remaining lower two storeys of the facade have the same combination of arcade and superimposed orders noted above at the Tabularium and the Basilica Julia. Here the lower order is Doric, the next Ionic.

## *Amphitheatres and Circuses*

The **Amphitheatre, Pompeii** (*c.* 80 BC with later modifications and additions), also preceded by a long interval any similar building in the capital. It is oval in plan, measuring 150 m × 105 m (500 ft × 350 ft) on its long and short axes. Again it represents a transition between the most comparable Greek form—that of the stadium—and the later Roman form. The seating (originally probably timber benches only) was supported on earthen banks and not on vaulted substructures, and there were no substructures beneath the arena—the sanded area on which the combats took place. To retain the earthen banks, there was, on the outside, a massive concrete wall buttressed by closely spaced piers carrying an arcade. Access to most of the seats was by means of external ramps which led to a terrace around the top.

The **Circus Maximus, Rome** (p.226C–E), was the oldest in the city and underwent a long series of enlargements, modifications and embellishments. It lies in the valley between the Palatine and Aventine hills and probably consisted originally of little more than a marked track, a low central wall (spina) around which the chariots were raced, and the starting gates (carceres). Later, a few rows of wooden seats were provided, and there were cone-shaped columns at the ends of the spina to mark the turning points. By the late first century BC, the plan of the Circus seems to have been essentially as it subsequently remained, some 600 m long × 200 m wide (2000 ft × 650 ft), though later emperors added fresh embellishments; it is the possible appearance in the fourth century AD which is shown in the restoration drawing. There were then three tiers of seats and twelve carceres, in spite of the fact that not more than four chariots seem to have raced together. Each race was of seven laps, equal to a distance of about 3.6 km (2.2 miles). The bas-relief gives a good idea of a racing quadriga, and the relief on a lamp shows the victor of a race.

## *Triumphal Arches*

Monumental triumphal arches, which seem to have been built first during this period, are perhaps large-scale sculpture rather than architecture. But their basic form is the particularly Roman architectural unit of the arch carried on isolated piers and decorated with superimposed orders, now further embellished with bas-reliefs and statuary commemorating a victorious campaign.

The so-called **Arch of Tiberius, Orange** (late first century BC) (p.224C), originally commemorated the achievements of the second legion in the conquest of Gaul, but later its inscription was changed to honour the emperor Tiberius. It is triple-arched with Corinthian three-quarter columns between the arches, on the two end faces, and on the outer corners. There are two attic storeys, filled, like the wall surfaces below, with a profusion of military motifs and trophies. Remarkably, for this early date, the entablature above the columns on each end face is broken between the central pair to allow an arched recess to rise into a pediment similar to that over the central arch.

## *Town Gates*

The gate known, in its partly restored present form, as the **Porte S. André, Autun** (p.245H), illustrates a fairly typical pattern which will be seen, with minor variations, in later gates. It has lost the usual rectangular inner court and the two flanking towers.

## *Tombs*

As Roman law forbade burial within the city confines, cemeteries lined the roads outside the gates. Both burial and cremation were practised, but it made little difference to the type of tomb structure whether it was built to take a sarcophagus for the body or an urn for the ashes. Designs for the more monumental tombs initially tended to be conservative, drawing on Hellenistic or other earlier models.

The **Tomb of the Julii, S. Rémy** (*c.* 40 BC) (p.247H), in Provence, is a cenotaph that rises in three stages. There is first a base ornamented with reliefs. On this stands a pedestal penetrated by arched openings flanked, on the four corners, by engaged Corinthian columns. At the top is a circular storey with smaller Corinthian columns and entablature, crowned with a conical stone roof. The motifs of the reliefs are mythological Greek scenes, though the Julii appear to have been rich Gauls who had acquired Roman citizenship.

Several **Tombs near Uzuncaburg** (p.229A), the ancient Olba, subsequently called Diocaesaria, also show strong Hellenistic influence despite their essentially Roman, and sometimes two-storeyed, temple-like forms.

The **Mausoleum of Augustus, Rome** (28–23 BC), built by Augustus as his own family tomb, looks back been the Temple of Vesta near the old forum, which was many times rebuilt and will be referred to later. This did not have quite the same function as the normal temple, and possibly the Pantheon did not do so either. It has been suggested that the intentions behind its construction may have been as much political and personal as religious, just as Augustus' intentions seem to have been partially personal in the case of the Temple of Mars Ultor. We know nothing of the temple ritual. We know merely that the building was adorned with numerous statues, including two in the portico of Augustus and Agrippa, and others inside of Julius Caesar, Mars and Venus. Certainly also the resemblance of the dome to the vault of heaven was recognised fairly soon, but this does not necessarily mean that it was intended from the start.

The porch is eight columns wide and three deep, and the unfluted monolithic columns of Egyptian granite are 14 m (46 ft) high, reducing in diameter from 1.5 m (5 ft) at the base to 1.3 m (4.3 ft) at the top, and have Corinthian capitals of white Pentelic marble (p.236A). They support an entablature which carries the inscription already referred to and a pediment which may originally have had a bronze eagle relief affixed to it (as suggested by the pattern of the fixing holes that remain). On its rear wall, on either side of the entrance to the rotunda, are two deep niches which held the statues of Augustus and Agrippa. The roof is no longer the original one. But sixteenth-century drawings and descriptions of it show its trussed framing to have been fabricated partly of timber and partly from riveted plates of bronze. The walls of the rotunda rise through three storeys constructed of brick-faced concrete separated by stone cornices, each storey now disclosing, in the brick facing, a ring of brick relieving arches. Originally, all this brickwork would have been faced with marble and stucco, but there was never any decorative use of applied orders as in most theatres and amphitheatres. The dome, seen fully only in more distant views, has the shallow stepped profile referred to as characteristically Roman in Chapter 7.

Once inside, the exterior is soon forgotten (p.237A). Geometrically, it is essentially a large sphere with its lower half expanded outwards to cylindrical form, and whereas the exterior cylinder was divided into three storeys, the corresponding part of the interior is lower and is divided into only two. As the section shows, this is because it corresponds to only the lower two external storeys, the uppermost external storey being above the springing level of the dome. Internally, the taller bottom storey has eight recesses around the circumference, alternately square-ended and rounded, and divided from the space directly beneath the dome by pairs of monolithic columns of differently coloured marbles, the shafts of which are reeded in their lower portions and fluted above. Corinthian capitals carry the entablature which marks the division between the two storeys. Above the next storey is the dome, with a large, central unglazed eye which is the only source of light when the bronze entrance doors are closed. On its surface are five rows of square coffers of diminishing size—surprisingly twenty-eight to a row, a number which does not correspond to the eight-fold division of the circumference below. They are designed so as to appear to diminish equally on all sides at each recession when seen from a central position at floor level.

Not all of the interior looks as it originally did, though it is the best preserved of all large Roman interior spaces (p.236B). The coffers were probably covered with stucco with moulded edges, and they had large gilded bronze rosettes in their centres. Most of the marble facings to the walls and floor are comparatively recent. The upper (or attic) storey was, for instance, refaced to a different design in 1747. But a section of it has been restored to the earlier design, and six capitals of the original marble pilasters may now be seen in the British Museum (p.236C). Their shallow relief carving, partly done with a drill, is remarkably close to some later Byzantine work (p.290A).

If, finally, one turns to the construction, it soon becomes apparent that the basic simplicity of the form belies a far more complex structural organism. It would be out of place here to describe it in detail, but it may be noted first that the 6 m (20 ft) thick cylindrical drum on which the dome stands has many more voids than the recesses already noted. These voids rise into the second storey behind the attic, and there are also hidden voids both above them and between them. In fact it would be truer to regard the whole drum as consisting of three continuous arcades corresponding to the three tiers of relieving arches visible on the outside of the building. The piers stand on a massive circular foundation, 4.5 m (15 ft) deep. Above the level of the highest external cornice, the dome is of solid concrete construction, reducing finally to about 1.2 m (4 ft) thick at the open eye. But a refinement here is a progressive variation in the nature of the cementae for the purpose of reducing the density of the concrete towards the top. Horizontal layers of travertine and tufa at the foot give way first to layers of tufa and brick, and at the top, to tufa and pumice.

The **Temple of Asklepios Soter, Pergamon** (*c.* AD 130 onwards), was an early smaller-scale copy of the Pantheon, centrally situated on one side of the large court of the sanctuary of Asklepios. It has an internal diameter of about 21 m (70 ft) and had a brick dome. Now only the beautifully constructed ashlar base of the drum remains.

In the **Temple of Venus and Rome, Rome** (consecrated AD 135) (p.222G,H), seemingly designed by Hadrian himself, the Hellenistic version of the Classical Greek temple was brought to Rome. In place of temporary timber centering. The top tier carrying the water channel itself is narrower and is composed of thirty-five arches of little more than 4 m (14 ft) span. The whole structure is completely unadorned. In the 17th century, the piers of the second tier were partly cut away to make room for a roadway. Then, in 1747, a new bridge was built alongside the aqueduct.

The **Pons Fabricius, Rome** (62 BC, restored AD 19) (p.233A), is the oldest surviving bridge in the capital and remains virtually unchanged except for a new roadway and parapets and an enlargement of the starlings that protect the piers from scour. Inscriptions running across the faces of the arches record the building and restoration of the bridge. Despite the sometimes reviled duality which results from its having a single central pier, it is a superb design, with a smaller arch placed over the pier to reduce the waterway in time of flood. An engraving by Piranesi shows similar small arches at each end where the present river embankments now form the abutments. The continuation of the main arches below the water to make complete circles of masonry also shown in the engraving, however, has no known factual basis. The bridge crosses only one branch of the Tiber. A second bridge, the **Pons Cestius**, was built at the same time on the other side of the island to complete the crossing, but this bridge was completely rebuilt late in the nineteenth century.

The **Bridge of Augustus, Rimini** (early first century AD) (p.233B), makes the easier crossing of the Marecchia with five similar arches varying in span from 5.1 m (17 ft) in the centre to 4.2 m (14 ft) at the extremities, the piers here being almost as wide as the arches in the direction of the span. The fine decorative detailing, still reasonably well preserved, was noted by Palladio and, through him, served as an inspiration for numerous later bridge designs.

## Imperial Roman from Tiberius to Hadrian

### *Temples*

The examples which follow illustrate the remarkable variety of shapes adopted for temple buildings and related structures during this period, including forms which had their origins in the Hellenistic East and another which was indigenous to Gaul.

The **Temple of Jupiter, Baalbek** (probably mostly mid-first century AD) (p.238G,H), was one of the largest Roman temples, though its dimensions of 87 m × 50 m (285 ft × 164 ft) fell considerably short of those of the largest Greek temples. It was the first part to be completed of the Roman remodelling of an earlier sanctuary. With its high podium, and with columns 20 m (66 ft) high and a height from the base of the podium to the top of the pediment of nearly 40 m (130 ft), it gave a Roman character to a building with an essentially Greek peripteral plan. The podium was constructed of huge blocks of a hard limestone, and the masonry of the superstructure, including the unfluted column shafts, was almost as cyclopean in scale. There were two rows of nineteen columns along each side, and the deep porch was ten columns wide and three deep.

The **Temple of Trajan, Rome** (completed by Hadrian *c.* AD 118), no longer exists, but it seems to have been virtually a copy of that of Mars Ultor on a larger scale. It stood at the furthest end of the Forum of Trajan, which is described below. Its scale is indicated by the remains of one of its columns which is almost 18 m (60 ft) high.

The **Temple of Hadrian, Ephesus** (dedicated *c.* AD 118) (p.241A), is a small street-side structure and not, therefore, designed to impress chiefly on a distant axial approach. Its porch is notable for the square corner piers, and for the combination of flat architrave and central arch.

The **Pantheon, Rome** (AD 118–*c.* 128) (pp.235, 236, 237A), was by far the most important temple, if importance may be measured by technical achievement and influence. Though Justinian's Hagia Sophia, Constantinople, surpassed it in a number of ways, its most notable feature—its great dome, with a span of 43.2 m (142 ft)—was unchallenged until 1420–36, when Brunelleschi vaulted the crossing of Florence Cathedral with a dome of slightly greater average diameter.

In several ways the form is a puzzling one. It combines a huge portico with an even larger rotunda, crowned by the dome. The portico leads into the rotunda but there is little other relationship between them, certainly not the sort of relationship that there was between porch and cella in earlier temples. An inscription on the porch attributing the construction to Agrippa, and the fact that there was a temple built by Agrippa (burnt in AD 80) on the same site, led to a belief that the porch was a survival from this earlier temple and that the rotunda only was new. It has been conclusively shown, however, that everything belongs to Hadrian's rebuilding. Presumably a porch of the traditional kind was still considered necessary to relate the temple to its surroundings, which were considerably different from those of today. Originally it stood at the head of a colonnaded square, whose ground level was substantially below that of the present piazza, and whose end walls, together with the colonnades, would have framed the porch in much the same way as the side colonnades and rear wall of the Forum of Augustus framed the porch of the Temple of Mars Ultor.

It is more difficult to say why a huge, domed circular cella was substituted for the traditional rectangular one, usually no larger than the porch itself. There were precedents, as we have seen, for a circular plan. The most relevant in Rome would probably have the traditional Roman cella, fronted by a deep porch and looking out in one direction only from its high podium, there were two cellas, back-to-back, dedicated respectively to Venus, mythical ancestress of the Roman people, and to Rome itself. In place of just a columnar porch—or two such porches—there was now a colonnade that surrounded the double cellas on all sides, with ten columns across each front and twenty along each side. And, in place of the high podium, the whole temple was set on a low platform surrounded by steps. Next to this, and a little distance from it, were further colonnades on the two long sides. A fire destroyed the timber roof in 283, and a major rebuilding followed, as will be described later.

The so-called **Temple of Diana, Nîmes** (*c.* AD 130) (p.238A–F), was a pavilion, the precise function of which has not been determined, in the sanctuary of the local water god Nemausus, after whom the town is named. It is constructed wholly of fine ashlar, and is architecturally important as the best surviving example of a type of structure that reappeared, with virtually no change, in the Romanesque buildings of this region of France. The central barrel-vault, semicircular in profile, was stiffened at regular intervals by ribs projecting downwards, and its thrusts were partly carried over to the outer walls of side passageways.

At Nîmes, the temple itself has disappeared. The so-called **Temple of Janus, Autun** (p.237B), is less well preserved, but it serves to illustrate one of the types built to meet the needs of conquered peoples. The setting did not differ greatly in overall character from that of the earlier sanctuaries already described. The temple itself usually had a tall cella—square, circular, or octagonal—and, around this, a portico with a sloping lean-to roof on all sides. At Autun, only the square cella remains.

## *Forums, Basilicas, and Related Structures*

The **Forum, Basilica, and Market of Trajan, Rome** (*c.* AD 100–112) (p.223A), designed by Apollodorus of Damascus, were among the principal monuments of this age. The more conventional basilica was possibly the most highly esteemed of all Roman buildings in the following centuries, and the market showed off admirably the new concrete architecture then coming to the fore and contrasting sharply with the earlier type of market described above.

There were very close similarities with the nearby **Forum of Augustus**, to which Trajan's Forum was also related spatially. Its equally dominant central axis was set exactly at right angles to that of the earlier forum. As before, the forum had colonnaded porticoes on each side, beyond which opened semicircular courts, and even their architectural detail was similar. The chief differences were at the far end where, instead of the forum leading directly to the temple, the basilica was interposed; behind this, there was a monumental column (described below) flanked by two identical library blocks. The market rose up the slope of the Quirinal hill to the north, though this would hardly have been seen from the forum, as it would have been shut off by the northern boundary wall. To create the level area needed for forum, basilica, libraries, and temple, vast quantities of earth were cut away from the slope of the hill.

The basilica, known as the **Basilica Ulpia** (pp.240A, 241B), was set transversely over the full 120 m (400 ft) width of the forum, and consisted of a huge rectangular nave, 25 m (80 ft) wide, surrounded on all sides by double colonnades, and extended beyond the end colonnades by two semicircular apses with attached orders for internal decoration.

There were probably galleries over one or both of the aisles created by the colonnades, and there must have been a trussed timber roof over the central nave; its span was almost identical with that of the fourth century basilica of S. Peter's, so that it could have served as the model for that roof. The ceiling is known to have been sheathed with gilded bronze, while the walls were covered with multi-coloured marbles.

The **Market** (p.241C,D,E) consisted largely of many shops of the standard form, which consisted of little more than a vaulted rectangular room, open to the front, and tall enough to take a timber mezzanine floor. The shops were disposed along straight and curved streets on different levels which followed, at the foot, the curve of the northern boundary wall of the forum and at higher levels were adapted to the contours of the hill. But at the highest level there was a large tall hall with a series of groined vaults, structurally rather like the tepidaria of the Imperial baths (p.241C). Other shops opened off this, and it presented a four-storey facade—with balconies at an intermediate level—to the street which ran, lower down, past its western side (p.241E).

Though little remains of the libraries behind the basilica, the **Library of Celsus, Ephesus** (AD 117–120) (p.237C), is much better preserved and its facade has recently been reconstructed. It is a rectangular building, wider than deep and measuring approximately 17 m × 11 m (55 ft × 36 ft). Internally there were shallow square-backed recesses for the books or scrolls at three levels and narrow galleries carried on closely spaced columns for access to them. A further feature was that the walls containing these recesses were not the outer walls. There were other walls separated by a narrow ambulatory to accommodate the stairs to the galleries and to give added protection—almost an early example of cavity construction. The facade was embellished with two storeys of columned aedicules, pairs of columns carrying flat entablatures in the first storey, and different pairs carrying alternately curved and triangular pediments in the top storey.

## *Thermae*

According to drawings by Palladio, the **Baths of Titus, Rome** (AD 80), of which nothing now remains, were the first to have many of the features of the layout that then became characteristic of later Imperial baths.

More remains of the considerably larger **Baths of Trajan, Rome**, built above part of Nero's Domus Aurea after it had been burnt in AD 104. The baths were dedicated in AD 109. They include the characteristic later feature of a spacious outer precinct with meeting rooms, lecture halls, and other accommodation for a wide variety of social activities—features which will be referred to in more detail in the description below of the Baths of Caracalla.

## *Theatres*

The **Theatre, Orange** (*c.* AD 50), is a good early example of a theatre in a western province. Built against a hillside, it has its seating largely set against the natural slope. It is notable for the good state of preservation of the wall behind the stage, which is almost 100 m (325 ft) long and 35 m (116 ft) high.

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## *Amphitheatres*

The **Colosseum** or **Flavian Amphitheatre, Rome** (pp.242, 244A,B), was commenced by Vespasian in AD 70 and inaugurated by Titus in AD 80, though not completed until a little later by Domitian. It is in the valley between the Esquiline and Caelian Hills where, not long previously, an artificial lake had been created as part of Nero's great landscaped Domus Aurea. As the first permanent amphitheatre in the capital, it was designed to take some 50,000 spectators, and a major concern in design must have been the practical problems of access and crowd control. The system devised was essentially that already adopted on a much smaller scale in the Theatre of Marcellus, a system of radial ramps and stairs giving access to circumferential passageways. Vaults spanning between radial and circumferential dividing walls supported the many tiers of seating as well as the ramps and some of the passageways.

The plan is a vast ellipse, measuring externally 188 m × 156 m (615 ft × 510 ft). There are eighty radial walls, and almost as many separate entrances around the circumference. Corresponding to these walls there are three tiers of outer arcades, tripled at the first two levels, and all carrying circumferential vaults to create double ambulatories at all three levels. From them there is direct access to the first two tiers of seating for those of equestrian rank and for other Roman citizens, while flights of stairs from the top ambulatories gave access to a third tier, which was separated from the others by a high encircling wall that took the place of the innermost arcade at this level. Beneath the arena, there is a further complex system of passageways, together with the dens for wild beasts and other provisions for staging the often gruesome spectacles for which the structure was built.

The floor of the arena has been lost, as has the original marble seating and the timber seating above. But much of the exterior is well preserved, despite the losses from the use of the structure as a quarry over many centuries. The three superimposed arcades are faced, in the manner already noted on earlier monuments, by three-quarter columns and entablatures. These are Doric in the first storey, Ionic in the second, and Corinthian in the third. Above them is a deep attic storey with shallow Corinthian pilasters and small square window openings in alternate bays to light the uppermost tier of seating, which seems to have been set within a continuous portico. In the other bays there were large bronze shields in place of the windows. At the top there are brackets and sockets to carry the masts from which a canopy, known as a velarium, was hung to give shade.

The feat of planning and organisation entailed in carrying out such an enterprise is a good index of Roman abilities. It was made possible partly by a careful combination of different types of construction: mass concrete for the 12 m (40 ft) deep foundations, a cautious use of travertine opus quadratum for the piers and arcades, tufa infillings of these piers to create the radial walls at the two lower levels, and brick-faced concrete for the similar infillings at higher levels and for most of the vaults.

The **Amphitheatres of Nîmes** and **Arles** (probably late first century) are just two of the many later ones which followed essentially the same plan as the Colosseum on a smaller scale. They differ in being built almost entirely of ashlar and in the detailing of the exterior. In the Colosseum, the horizontals were emphasised by the way in which the entablatures swept unbroken around the whole circumference. In these structures, the vertical continuity of the columns was equally stressed by stepping forward and returning the entablatures above each column.

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## *Triumphal Arches and Columns*

The **Arch of Titus, Rome** (after AD 81) (p.245A–C), was erected after the emperor's death, to commemorate chiefly the capture of Jerusalem. It has a single opening flanked on each outer face by attached columns with early examples of the Composite capital. On the coffered soffit of the arch and the wall faces below it are reliefs of the emperor and the spoils from the Temple in Jerusalem. The outside faces of the piers are exemplary nineteenth-century restorations undertaken as far back as 1821 after demolition of the fortification in which the arch had been incorporated in the Middle Ages. They make good what had been destroyed, without any attempt at deceit.

The **Arch of Trajan, Beneventum** (*c.* AD 115) (p.244C), still in a fine state of preservation, is of similar type but with almost an excess of relief decoration.

**Trajan's Column, Rome** (*c.* AD 112) (p.247A–G, 241B), whose setting has already been mentioned in the description of the Forum, served a similar commemorative function to the arches and became the model for several later columns such as that of **Marcus Aurelius** (AD 174). In form it was closest to the Doric order. But its height of 35 m (115 ft), its decoration with a continuous spiral frieze narrating Trajan's Dacian wars, the bronze eagle, and a statue of the emperor (which originally stood where there is now a statue of S. Peter) were its more telling features. Even from the buildings which originally flanked it, it can never have been easy to see all the incidents portrayed; they are more visible today in a full-size cast in the Victoria and Albert Museum, London.

## *Town Gates*

The **Porta Palatina, Turin**, and **Porta dei Borsari, Verona** (both first century), are slightly later examples of the type of gate, part ceremonial and part defensive, already seen in Autun. Here the road arches are surmounted by two galleries, whose smaller arched openings were framed by applied orders, entablatures, and even pediments.

## *Tombs*

There is doubt whether the **Khasneh (Treasury)** (p.247J) and the similar but even larger **Deir (Monastery), Petra** (both possibly late first century), were tombs or temples. Their size, and the location of the second, make the latter seem possible. But the Khasneh was included in previous editions of this book as a tomb, so they are both included here under that heading. They come within a much older eastern-Mediterranean tradition of rock-cut tomb and temple architecture, in which all emphasis was on the facade which usually made use of features taken from contemporary built architecture. At Petra, the Khasneh is the more classical of the two, but the difference in style between them is not large. The upper storeys are more three-dimensional than the lower ones. They call to mind some of the motifs of Pompeian wall painting, but are almost certainly direct developments of the local Hellenistic architecture. The scale exceeds even that of the temples at Abu-Simbel (see Chapter 3). The facade of the Khasneh is 27 m wide × 39 m high (92 ft × 130 ft) and that of the Deir 45 m wide × 40 m high (154 ft × 132 ft), but the simple rectangular chambers behind the facades are of less interest than the Egyptian temple interiors.

The **Mausoleum of Hadrian, Rome** (AD 135–139) (pp.241F, 247L), obviously modelled on the Mausoleum of Augustus which it closely resembles in shape and size, in the Middle Ages became the Papal Castel S. Angelo. It was originally faced with Parian marble and decorated with statues around the drum, and was crowned by a cylindrical tower on which was a large sculptured quadriga. Internally there was a system of radial and circumferential walls, within which a corridor climbed to the central barrel-vaulted tomb-chamber containing the porphyry sarcophagus.

## *Villas and Palaces*

The **Domus Aurea (Golden House), Rome** (AD 64–68 and possibly later), was built or begun by Nero after the great fire in AD 64. It was less a palace than a series of pavilions and a long wing comprising living and reception rooms, all set in a vast landscaped park with an artificial lake in its centre where the Colosseum now stands. Most of it has largely disappeared. The main architectural interest lies in the wing just referred to, known as the Esquiline wing, which stood a little to the north of the lake and was subsequently built over to form part of the enclosure of the Baths of Trajan. It most resembled the country and seaside portico villas of Campagna, and was open to the views of and beyond the lake. The more westerly part, which was certainly of Nero's time, also had a peristyle behind the facade. In the centre, the facade was set back, following three sides and two half-sides of an octagon. To the right of this was the less conventionally planned eastern part, which contained the feature of greatest importance and originality (pp.248C, 249A). This was an octagonal hall roofed by a concrete dome, 14.7 m (50 ft) across the corners, and open on all sides to the garden or to surrounding smaller rooms—as far as is known the first appearance in a building of this kind of a new concept of interior space which was to come increasingly to the fore over the next half-century. It is possible that it was never completed. But it is said that the decoration of those parts of the palace that were completed was unusually lavish. Some of the painted stucco survives, and when it was discovered in the Renaissance it provided the inspiration for some of Raphael's decorations in the Vatican.

The **Flavian Palace (Domus Augustana), Rome** (inaugurated AD 92 and with later additions) (pp.248A,B,D, 249B), occupied much of the top of the Palatine Hill, but was more compactly planned. To obtain more space, substantial parts were built over deep vaulted substructures. The parts of chief interest are the official or state rooms grouped around a peristyle on one side of the palace, and a pair of rooms that open off a smaller court in the private wing set between the official wing and a long sunken garden in the form of a stadium on the opposite side (p.249B).

The uses of the principal state rooms are not precisely known. The one named on the plan as the basilica may have been vaulted, in much the same way as was the so-called Temple of Diana at Nîmes, but now in concrete. However, this is much less likely in the case of the audience hall, despite previous restorations showing it with a wide barrel vault. The private wing is notable for the strict axial symmetry of its planning. The pair of rooms referred to were mirror images of one another on opposite sides of the north wall of the court. They were vaulted like the octagonal room of the Domus Aurea, but the plan below was different, being now a square the corners of which were filled with diagonally set apses. Half-domes over these apses turned the square into an octagon, just as the squinch did in later architecture.

**Hadrian's Villa, Tivoli** (*c.* AD 118–134) (pp.249C, 250, 252), is a later counterpart of the Domus Aurea, though built as a retreat in the country rather than being set in the city. Walking around it today, it is still possible to experience something of the variety of architectural forms and settings, and the skilful way in which Hadrian and his architect have contrived the meetings of the axes, the surprises that await the turning of a corner, and the vistas that open to view. It was possible here to experiment with new forms and new types of spatial composition, and some of the results are seen in the Island Villa, the vestibules at the ends of the Piazza d'Oro, the Small Baths, and the Canopus. The most characteristic feature is a constant play upon curves and counter-curves in place of the rectilinear shapes used in most earlier planning. Within a circular outer wall, the Island Villa (p.252B) contains a colonnade and moat, and a bewildering arrangement of apsidal, convex, and concave rooms focused on a central fountain court. The domed southern vestibule of the Piazza d'Oro has a form related to that of the two rooms in the Domus Augustana just described. But here there are apses opening off most sides of the octagon, and the apses project externally to create a new volumetric expression of the interior (p.252A). The central room to the north has a more complex plan, with apses alternating with inwardly projecting curved columnar screens. This room can hardly have been vaulted (or, if it was, the vault would not have stood for long) but there is a vestibule in the Small Baths where the walls are similar in plan, and which is vaulted over a similarly undulating surface internally. And at the head of the Canopus there was a pavilion of equally complex plan, open at the front and with water cascading into it at the rear (p.249C).

### *Aqueducts and Bridges*

The **Aqua Claudia, Rome** (AD 38–52 with numerous later repairs and restorations) (p.253A), was one of the principal channels of water supply to the capital at the time of its completion, bringing water, originally, from a source 66 km (41 miles) away. For long distances outside Rome, the channel was carried at heights of almost 20 m (68 ft) above the original ground level on lofty arches constructed partly of opus quadratum and partly of concrete.

**Trajan's Danube Bridge, Turnu Severin** (AD 104–105), perhaps designed by Apollodorus of Damascus, architect of Trajan's Forum, is known only from remains of the pier foundations, from descriptions, and from a relief on Trajan's column. It is included here as a later example of timber construction. Framed timber arches were carried on twenty masonry piers over a total length of 1100 m (almost ¾ mile) with individual spans of between 35 m (115 ft) and 38 m (130 ft).

**Trajan's Bridge, Alcantara** (AD 105–106) (p.253B), is the most impressive survivor of the type of Roman bridge, with tall piers and wide-spanning arches, that was built over deep valleys. The central arches are 27.3 m and 28.5 m in span and carry the roadway 48 m above the River Tagus. A commemorative arch stands over the central pier and an inscription records the name of the architect: C. Julius Lacer. There have been several restorations of some of the arches.

The **Pons Aelius, Rome** (now the Ponte S. Angelo, completed AD 134) (p.241F), was built to give access to Hadrian's Mausoleum. The central three arches are Hadrian's, though the decorative treatment is largely of the sixteenth and seventeenth centuries, including the statues of angels by Bernini. Pairs of smaller arches at each end were rebuilt as single arches in the nineteenth century to give a level roadway from end to end when the present Tiber embankments were constructed.

## Imperial Roman from Antoninus Pius to Constantine

The **Temple of Antoninus and Faustina, Rome** (begun AD 141) (p.222D–F), was built by Antoninus in honour of his deceased wife. It was of simple traditional Roman form, raised on a podium, and with a deep porch leading to a spacious cella of the same width.

Construction of the **Sanctuary of Jupiter Heliopolitanus, Baalbek** (pp.238G,H, 256A), already referred to in the description of the temple, continued until the mid-third century. Its other chief features were the main court, in which were set two tall altars, a hexagonal forecourt and, in front of this, a magnificent propylaeum or porch with towers at each end.

There were colonnaded porticoes along both sides of the main court, and, behind these, alternating rectangular and semicircular exedrae which were partly screened by further columns of red and grey granite (p.256A). The forecourt and propylaeum are less well preserved, so that the details are conjectural. But note the arch which again interrupts the flat architrave on the front of the propylaeum.

The **Temple of Bacchus, Baalbek** (mid-second century) (pp.238G,H, 255), stands a little to the left of the sanctuary. It is on a scale not much less than that of the Temple of Jupiter, and has a large cella at the far end of which is another smaller temple-like structure: the adyton or holy-of-holies (p.255A). The fact that this second temple was built so close to the Temple of Jupiter suggests that it was to accommodate adherents of one of the newer mystical religions. The architectural detail of the temple is rich (p.255B) and includes two-storey aedicules which break up the wall surfaces behind the interior columns. Equally rich detail is found on the soffits of the ceiling slabs which span between the cella walls and the outer colonnades.

The much smaller **Temple of Venus, Baalbek** (third century) (pp.256B, 257D–F), also stands nearby, looking towards the entrance of the main sanctuary. It combines a circular cella with a square-fronted porch wide enough for the lines of the outer columns to be continued unbroken round the outside of the cella. Here, the bases and capitals of the columns are five-sided, and both the podium and the entablature curve inwards between each pair of columns in a Baroque manner.

The **Serapeum, Pergamon** (third century), has a more frankly Eastern arrangement. The central structure here was a large brick-built rectangular building with nave, aisles and galleries, and an apse at the far end, whose massive outer walls and equally massive foundations for the nave colonnades are still largely preserved. It stood in a huge rectangular precinct, where it was flanked by two symmetrical colonnaded courts, each with a pool for ritual bathing and a tall domed rotunda at its far end.

The **Temple of Vesta on the Forum Romanum, Rome** (an early third century rebuilding of a much more ancient structure) (p.257A–C), retained the simple circular plan seen already in several other temples. Here it may have derived directly from the primitive round hut. The temple differed in function from most other temples in Rome in being the place where a sacred fire was kept burning, tended by the Vestal Virgins who lived close by. The present partial reconstruction of the temple is based on excavations and representations on reliefs and coins.

The **Temple of the Sun, Rome** (AD 275–280), built by Aurelian, brought to Rome a largely Eastern form: essentially that which is seen, for instance, in the Sanctuary of Bel at Palmyra, but with some features more reminiscent of the sanctuary at Baalbek. It is known chiefly from drawings by Palladio which show a circular, central temple building set in a large rectangular court approached through a smaller rectangular court with half-circular ends.

The **Temple of Venus and Rome, Rome** (pp.222G, H, 256C), as restored by Maxentius between AD 307 and 312, had new cellas built within what had survived of the walls of the timber-roofed Hadrianic cellas. The thicker new walls, decorated with columnar aedicules and faced with marble, supported coffered vaults. A further innovation was the replacement of the earlier square ends by back-to-back apses with concrete semi-domes, whose surfaces were enlivened by lozenge-shaped coffers that diminished in size towards the top (p.256C).

## *Basilicas*

The plan of the **Basilica, Leptis Magna** (dedicated AD 216), is remarkably similar to that of the central building of the Serapeum, Pergamon, except for the fact that it has two identical apses, one at each end. The walls were constructed of stone throughout, with the two-storey colonnades that separated the aisles and galleries from the nave continued, as attached columns, around the walls of the apses.

The **Basilica, Trier** (early fourth century) (p.240F,G), was an aisle-less rectangular hall with an apse at one end only. Unusually for this area, its walls were constructed of brick throughout their thickness. The elevations were given a simple grandeur by double ranges of round-headed windows, set, on the outside, within taller blind arcades—a foretaste of the wall treatment of later Christian basilicas such as S. Sabina, Rome. Less typical of these later basilicas were subtle variations in the size of the apse windows to make the apse appear larger and deeper than it really was.

The **Basilica of Constantine, Rome** (AD 307–312 and later) (pp.240B–E, 258A), also known as the **Basilica Nova,** was begun by Maxentius and completed and partly remodelled by Constantine. Its design derived from the central halls of the later Imperial baths. But it is larger in scale than any of these and has been isolated from the other rooms that surrounded the bath halls. The central nave, 80 m long and 25 m wide (260 ft × 80 ft), was roofed by three coffered concrete groined vaults rising 35 m (115 ft) above the floor. To reduce slightly their spans, they sprang, like the similar vaults in the bath halls, from short lengths of entablature carried by monolithic columns—here of Proconnesian marble. To each side of the nave were three lower transverse bays separated by massive piers and spanned by coffered barrel vaults. Little now remains standing, apart from three bays on the north side. Nevertheless, they give some idea of the scale of the interior, if not of the opulence of its marble finishes. There were two apses, a narthex-like porch at one end, and a central porch on the south side. The narthex and end apse are part of the original design. The chief modification for which Constantine was responsible was a shifting of the major axis by the addition of the northern apse and the southern porch. The manner of buttressing the thrusts of the high vaults of the nave is similar to that adopted later in the transverse direction in Justinian's Hagia Sophia, and, in principle, to that seen in some Romanesque and most Gothic churches.

### *Thermae*

The **Baths and Gymnasium, Sardis** (second century and beginning of the third century) (p.258B), represent the final fusion, in the Eastern empire, of the Roman thermae with the Greek gymnasium. The baths block stands at the end of the large porticoed square of the gymnasium, itself fronted by a colonnaded court of typically Eastern character looking out over the gymnasium.

The **Baths (Thermae) of Caracalla, Rome** (AD 212–216) (p.260), today give the best idea of the layout of the fully-developed Imperial bath, being, though partly ruined, unencumbered anywhere by later structures. The completely symmetrical planning about the principal axis, the compact arrangement of all the parts of the baths proper in a single block, and the setting of this block in a much larger landscaped park surrounded by shops, services, and pavilions for other uses, will be apparent from the plan. Even the main block measured 225 m × 115 m (750 ft × 380 ft) without the projecting mass of the caldarium. Arranged in sequence on the main axis of this block were the open swimming bath or natatio, the central hall or frigidarium (both of these with their longer axes running transversely), the smaller tepidarium, and finally the domed circular caldarium. This last was lit by large windows in its drum, while the central hall was lit chiefly by windows in the clerestory, just below the vaults. Other rooms opened off to each side, duplicating one another exactly, with the two exercise yards or palestrae towards the two extremities. All but the south side presented, on the exterior, large expanses of wall with relatively small window openings. But the rooms to each side of the caldarium on the south had much larger areas of window, looking over the gardens.

The **Baths of Diocletian, Rome** (*c.* AD 298–306), were built on an even vaster scale, and again large parts are well preserved. The general arrangement was similar to that of the Baths of Caracalla, but the planning of the main block was somewhat tighter, and the circular-domed caldarium was replaced by a form that was a smaller-scale version of the central hall with the addition of apses in the centres of all four sides. As already mentioned, the central hall is now the church of S. Maria degli Angeli, the initial conversion having been carried out to the designs of Michelangelo with modifications by Vanvitelli.

The **Imperial Baths, Trier** (early fourth century), show a variation on this plan on the somewhat smaller scale appropriate to a provincial capital of the tetrarchy. Here, the rectangular porticoed palestra is the largest unit, and as at Sardis the baths proper close its fourth side. As originally planned, the principal rooms were not only symmetrically disposed about the main axis, but were almost equally symmetrical about the transverse axis, with the circular tepidarium as the central hub and no natatio.

### *Theatres, Amphitheatres and Circuses* [illegible]

The **Theatre at Aspendos** (AD 161–180) (p.261A) shows no significant change in general design from the earlier theatres of the imperial period. But the stage buildings remain intact, except for the loss of the columns of the two-storey aedicule facing the cavea, and of the statuary which they must have contained, so that the structure gives a better impression of the original appearance of a Roman theatre than most of them now do.

The **Amphitheatres, Verona** and **El Djem** (early third century), are similar to the Colosseum, but smaller and with less emphasis on the decorative external orders, so that the arcades are the dominant features.

The **Circus of Maxentius, Rome** (early fourth century) (pp.226B, 262A), was similar to the Circus Maximus, but was built on level ground alongside Maxentius' Palace on the Via Appia. The tiers of marble seats were therefore supported, as in most amphitheatres, on raking concrete vaults and surrounded by a wall. There are tall towers at each end of the carceres.

### *Triumphal Arches, Columns and Colonnades*

The **Column of Marcus Aurelius, Rome** (AD 174), is very similar to Trajan's Column, and, like it, formerly stood in front of a temple dedicated to the emperor. The statue of the emperor has now been replaced by a statue of S. Paul.

The **Arch of Septimius Severus, Rome** (AD 203) (p.245D–F), commemorating the emperor's Parthian campaigns, was built of white marble in traditional triple-arched form, but shows a new freedom in the style of its relief decorations.

The **Arch of Constantine, Rome** (*c.* AD 312–315) (p.261B), was the last of these arches in Rome. Again it follows the traditional form. Though it is finely proportioned, close inspection shows that much of the relief decoration was taken from earlier monuments and reused.

Similar arches were also erected during this period in the provinces. But it is of more interest now to note a commoner type of monumental arch in use in the East, especially in the provinces of Syria and Arabia. This was more like some of the city gates described above, but stood at a focal point of the city's main thoroughfares. There are good examples still standing in cities like **Jerash** and **Palmyra**. With them was associated another characteristically Eastern form—the colonnaded street, which was to develop soon into another type of market.

## *Tombs*

The family tombs of the **Vatican Cemetery, Rome** (disclosed by excavation beneath the present S. Peter's and mostly second century), those of the **Isola Sacra Cemetery, Ostia** (second to fourth century), and those along the **Via Appia** and **Via Latina, Rome**, are counterparts of the tombs in Etruscan cemeteries described above. Like them, they reproduce contemporary domestic architecture, though now in a more abbreviated form and in brick-faced concrete. The **Tomb of the Caetennii, Vatican Cemetery** (mid-second century), is one of the more splendid examples. The heads of the entrance door and windows on the facade are ornamented in stucco. Inside, there is a single square room, with columned and pedimented niches and other aedicules around the walls with low recesses for sarcophagi below them.

The **Mausoleum of Maxentius, Rome** (*c.* AD 310), and the better preserved **Tor de'Schiavi, Rome** (*c.* AD 300) (p.247K), were virtually smaller copies of the Pantheon. There were differences of proportion and detail, including a closer relationship between porch and rotunda and the presence of windows in the attic storey of the rotunda—which was again, internally, the base of the dome. They differed also in being raised on a podium and free-standing.

**Rotundas** which were probably intended as their mausolea in the palaces of Diocletian at **Spalato** and of Galerius at **Salonika** were further examples of this form of about the same date, though the shape of the latter was more akin to that of the caldarium of the Baths of Caracalla. These two later became, respectively, the cathedral and the church of S. George.

## *Palaces, Villas and Garden Pavilions*

The so-called **Temple of Minerva Medica, Rome** (mid-third century) (pp.257G,H, 262B), was really a pavilion in the villa of the emperor Gallienus. It is a building in which the possibilities opened up by some of the pavilions in Hadrian's Villa at Tivoli were developed further, and it led on towards some of the early centralised church plans of the next century. A central decagon was expanded by apses on all sides except that of the entrance. Four of these apses were bounded originally by open colonnades instead of solid walls. Above them, in the decagonal drum, there were large windows and, above this, a dome with rib-like circumferential and radial bands of brick embedded in the concrete. However, the initial design appears to have been too daring, and two large flanking hemicycles and two projecting buttresses were added later on the outside.

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**The Palace of Diocletian, Spalato** (*c.* AD 300–306) (pp.264B, 265A,D), was built on the eastern shore of the Adriatic as a place of retirement. It was planned to be self-sufficient in a way that a palace situated within a city did not need to be, and it has the aspect of an Eastern frontier town with its basic grid plan and defensive perimeter wall. The extensive use of ashlar as well as concrete, the colonnaded streets, and much of the architectural detail, strongly suggest that the architect came from Syria or Arabia.

Today, much of the site is still occupied by the town (now called Split) that grew up later within the walls. But the plan of the palace is reasonably clear, with the imperial apartments concentrated on the side that faces the sea. There was a domed circular vestibule to these apartments on the central axis of the whole plan, just behind the portico. To each side of the peristyle (p.265A,D) there were courts containing, on one side, a small temple with barrel-vaulted cella and two smaller rotundas, and, on the other side, the probable mausoleum rotunda, now the cathedral, referred to above. Around the remaining sides of the complex were many smaller rooms, presumably providing accommodation for soldiers and for the emperor's domestic establishment. There were three monumental entrance gates, each guarded by a pair of octagonal towers, and there were other square towers between them around the perimeter. Blind arcading, echoing the arcades of the peristyle, formed the chief decoration of the gates and perimeter wall.

The large so-called **Imperial Villa, Piazza Armerina** (early to mid-fourth century) (p.264A), provides a sharp contrast to Diocletian's Palace, being comparatively undefended in its remote Sicilian valley. It consisted of groups of single-storey buildings and courts set, apparently informally, in the landscape. It is much more like Hadrian's Villa at Tivoli, and was originally thought (partly on the basis of the great expanses of mosaic flooring) to have been a country retreat of Diocletian's co-emperor Maximian. Comparison with Hadrian's villa shows, however, a much greater compactness and a marked inward-looking quality. As at Tivoli, the buildings at Piazza Armerina fall into clearly defined and axially planned groups for different uses: public rooms, private apartments and baths. But there is little space between the groups, so that the changes of axis are more abrupt. There are also forms that did not appear in Hadrian's Villa, but were introduced only at this time or during the previous century or so, and were to have considerable importance in later architecture. One of these, the multilobed rotunda, has been seen already on a larger scale in the so-called Temple of Minerva Medica. The others are a triple-apsed reception hall or triconch, and curved porticoes or sigmas giving access to such rooms—so named from the resemblance of the plans to the capital form of this Greek letter sigma, which was written at the time as the Latin capital C.

## *Domestic Architecture*

The later evolution of domestic architecture in Italy can best be followed in Rome's original port of **Ostia**. The town was fairly densely built up from the early second century onwards, with the commonest type of development being a multi-storey block for multiple occupation built around one or more internal courts. Four storeys were usual, with brick-faced concrete walls carrying concrete vaults for the alternate floors, and with intermediate floors of timber.

The **House of Diana at Ostia** (mid-second century) (p.265B) has a typical street frontage. Shops occupied the rooms opening to the street, and the small windows just below the balconies provided daylight to the timber-floored mezzanines which were reached by internal timber stairs. Concrete stairs gave access at two points to the higher floors. The **Horea Epagathiana** (*c.* AD 145–150) (p.265C), a large warehouse and store with living accommodation above, in the centre of the town, has a more elaborate entrance front. The **House of the Serapide** (late second century) (p.230E), adjacent to a public bath building, shows typical internal planning.

Perhaps because of their durable concrete construction and consequent long life, blocks such as these established a tradition of tenement design that lasted virtually unbroken in Italy and some neighbouring countries until the beginning of the present century.

The importance of Ostia declined, however, with the result that later construction there was usually on a smaller scale, as seen in the **House of Cupid and Psyche** (*c.* AD 300) (p.265E) where, around a fountain court, there were columnar arcades similar to those of grander scale in Diocletian's Palace.

Domestic architecture in those provinces where construction techniques and climate were not greatly dissimilar seems broadly to have followed the pattern seen in Ostia. In Syria and Arabia, different construction techniques and a substantially different climate did, however, lead to different forms. A house block at **Umm el-Jemal** (third or fourth century) (p.230C,D) is an Arabian (now Jordanian) counterpart of the larger blocks in Ostia. Here, windows are smaller, and construction including floors is entirely in cut stone. Where rooms were too wide to be spanned by single blocks, the spans were reduced by throwing arches across them at intermediate points. Flat roofs were provided for outdoor sleeping.

## *Aqueducts and Bridges*

The design of aqueducts and bridges did not change much during this period. But, to reduce the necessary height of its piers and arches, the **Aqueduct, Aspendos** (third century), was constructed with pressure pipework over the long elevated section that crossed the valley near the town. Towers were then provided near each end at which the water was allowed to find its natural level and thereby control the pressure in the pipes.

## *Defence Walls and Town Gates*

The **Porta Nigra, Trier** (probably early fourth century) (p.245G), was a later counterpart of the gates like the Porta Palatina, Turin, with double entrance arches, two-storey arcaded galleries with superimposed decorative orders, and round-fronted towers at each side. Here, though, the gallery arcades were carried around the towers also, only one of which seems to have been completed to its full intended height.

The **Aurelianic Walls, Rome** (*c.* AD 270–280), were the principal defence work of the period, with a total length of about 19 km (over 12 miles), some 380 projecting square towers 100 Roman feet (or two arrow shots) apart, and fourteen principal gates. Of these, the **Porta Ostiensis** (now Porta S. Paolo) (p.229B) still has virtually its original form, with a round-fronted tower at each side of the entrance archway and a gallery above it for the portcullis. Some gateways had two entrance archways, but none seems to have had the embellishment seen in Turin and Trier.

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be comparatively recent. There are few surviving original furnishings. Yet the impression of richness, if the effort is made to discount any Baroque heaviness, is not wholly misleading. There is evidence that gilt, coffered ceilings already hid the roof trusses of some churches in Constantine's time. In place of the marble floor there would have been mosaic, such as those recently uncovered at Aquileia and Gerash. Marble, painted stucco, and mosaic would have covered much of the wall surfaces. And the furnishings, such as the altar and its ciborium and the screen around the sanctuary, would doubtless have been richly gilded and even studded with jewels.

In fact, it is quite clear that, from the start, Constantine wanted his new churches to be just as magnificent as any other existing buildings: to have made them less so would not have proclaimed the new faith as he wished. The chief way in which they did fall short of earlier Roman buildings was that the columns, unmatched capitals and other similar features were frequently reused from earlier buildings, but paradoxically such idiosyncrasies imparted a greater liveliness to interiors than they might otherwise have possessed. In the new churches there was much more frequent use of the arch to span between the columns of a colonnade. Although the flat entablature was not deliberately abandoned and seems to have remained the preferred form, a shortage of readily available architrave blocks of the necessary sizes encouraged the use of the arch.

Variations in character reflected different local resources and traditions of construction. In Syria, where there was still a fine live tradition of cutting stone, there was, for instance, more emphasis on carved decoration and on the exterior—which, elsewhere, counted for little at this time. In central Anatolia and Armenia there was probably an early use of stone vaulting in place of timber roofing. Variations also developed in those detailed aspects of planning that catered for the specific needs of a liturgy which evolved differently throughout the empire. They involved such matters as the provision of entrances, internal barriers, and secondary spaces.

The rectangular basilica was not, however, the only form adopted for the church. More centralised plans, focused on a central vertical axis rather than a longitudinal horizontal one, were also adopted occasionally. The reasons for this are still debated, and probably there was more than one. There were two possible Roman prototypes: the circular temple (such as the Pantheon) and the centralised audience hall or garden pavilion (such as the so-called temple of Minerva Medica) which became typical of later Roman palaces. The second seems the more likely, since its connotations of 'House of the Lord' would not have been inappropriate to the House of God or *Domus Ecclesia*, and there was at least one early example (in Salonika) of the conversion of such a pavilion to church use. The centralised church plans varied from the completely circular to more complex lobed (usually tetraconch or four-lobed) forms set within an overall octagon or square.

Only one major example of a newly-built church of completely circular plan has survived: S. Stephano Rotondo in Rome. In detailed design this church resembled normal contemporary basilicas. But its effective use must have presented considerable problems, and the lack of any follow-up suggests that it was acknowledged to have been a mistaken experiment. There were more examples of the tetraconch plan and variants, probably beginning with the Golden Octagon in Antioch and including S. Lorenzo in Milan a little later. Here the principal central space was expanded, not just by a continuous ambulatory, but also by semicircular exedrae. There was a secondary longitudinal axis running from the entrance to the altar. To these variants on the rectangular basilica must be added a few examples of basilicas dating from the late fifth and early sixth centuries in which a square bay of the nave just in front of the apse was accentuated by allowing it to rise into a low tower, thus giving a central vertical emphasis of a different kind.

The requirements for the baptistery were simple: a central font into which those to be baptised could descend, and sufficient space around it for officiating clergy. For this purpose a simple circular, octagonal, or other centralised plan was the obvious and almost universal choice. If the structure was large enough to warrant it, there was an ambulatory around the central space. There was usually a central dome, which might be decorated with a representation in mosaic of Christ's baptism.

Individual tombs followed earlier Roman patterns, and were distinguishable chiefly by the subject matter of their decoration, although even this was sometimes sufficiently ambiguous to make it possible to question whether the building (for instance the mausoleum of Constantine's daughter Constantia, now the church of S. Costanza) had been a Christian or a pagan one from the start. The covered cemetery was, on the other hand, another new form, albeit a short-lived one and largely confined to Rome if surviving examples are a valid guide. In most respects its usual plan might be regarded as a simplification of the basilican church layout. It was a long apsidal-ended rectangle consisting of a nave flanked by single aisles, but with the aisles continued around the apse without any interruption to serve as an ambulatory. Little is known of the usual decoration. In due course the floor would have been covered with burials, and it became usual to add free-standing mausolea around the sides for the more important burials.

A related group of new buildings might be referred to generally as memorial structures. Many, but not all, were martyria in the strict sense of structures built over martyrs' tombs. One of the earliest and most important was the Constantinian church of S. Peter's in Rome, built over what was believed to be the saint's tomb. The other important Constantinian foundations of this kind were the memorial structures erected on the principal sites in the Holy Land associated with Christ's birth, ministry, death, and resurrection. An important later example was the church of S. Simeon Stylites built around his column at Kalat Siman. The forms of these buildings were widely varied because, apart from their purely commemorative role, they usually served also some of the functions of the normal community church in providing for throngs of pilgrims and in serving as covered cemeteries for those who wished to be buried alongside the saints they commemorated. Indeed it must have been through this that the practice developed of interring relics of saints beneath the altars of normal churches. In addition to the forms already noted, the cross-shaped plan with four long arms was also used and was probably adopted as much because it allowed larger congregations or different activities to focus on a central shrine or other memorial as for its Christian symbolism.

## Sixth-century Changes

Christian architecture in the sixth century is dominated by one building, Justinian's church of Hagia Sophia, or Divine Wisdom, in Constantinople. Indeed so great was its impact that all subsequent Byzantine church architecture was profoundly affected by it, and its influence spread also to the new Russian state in the tenth century.

Hagia Sophia was the greatest vaulted space without intermediate supports that had ever been built, and it remained so throughout the history of the Byzantine empire. All who entered it were overwhelmed by a central dome that hovered high above them—seemingly 'suspended by a golden chain from heaven', in the words borrowed by the court historian Procopius from Homer—and the use of the dome became almost obligatory in later Byzantine architecture. With it, of course, came a centralising emphasis on its vertical axis. Hagia Sophia also showed how this emphasis could be combined with an equally important longitudinal one. But the manner in which the basilican plan was fused with the earlier tetraconch plans was less easy to emulate satisfactorily on a smaller scale, and the designers of later Byzantine churches were content to allow the central axis to predominate over the longitudinal one, as it had done in the contemporary church of SS. Sergius and Bacchus.

Partly because of the great impression that Hagia Sophia made on the Turkish conquerors in the fifteenth century, it was spared the fate meted out to some churches, and has come down to the present day in a state which, though much changed, does make it possible to visualise the impression it created in the sixth century. To anyone susceptible to the effects of enclosed spaces, its unique spatial quality would have coloured all else.

Not only were the emphases on the two axes perfectly brought together, but it was done in a way that left the spatial boundaries elusive. Furthermore, the enfolding surfaces took away all sense of the massiveness of the piers which sustained the dome and other vaults. Walls and piers were sheathed in marble in a manner which reflected Early Christian adaptations of Roman techniques, and they were interrupted by two-storey open colonnades which—unclassically—had different column spacings at the two levels. Gold mosaic using purely non-figural motifs originally covered all the vault surfaces, and probably also the wall spaces between the windows at the highest levels. Large windows—considerably larger than today—flooded the whole interior with light which caused the marble and mosaic to glow with a seemingly internal radiance. Still more refulgent colour was contributed by the silver and gold that covered altar, ciborium, screens and other furnishings long since lost. Finally, there was a new vocabulary of carved ornament. Up to the late fifth century classical forms, though changed in their precise interpretation and execution, had continued in use. Now, for example, there were capitals with integral impost blocks all the surfaces of which were decorated with shallowly cut and undercut leaves, basket work, and other motifs—although they were more restrained in Hagia Sophia than in some other contemporary work.

Hagia Sophia, however, was by no means Justinian's only church commission. Procopius enumerates more than thirty other churches for which Justinian was responsible in Constantinople alone, the most important being his rebuilding of the church of the Holy Apostles. For this, and for the rebuilding of the large basilica of S. John at Ephesus, a cross-shaped plan was adopted, with nave, transepts, and eastern arm divided into square bays each vaulted with its own dome. As in Hagia Sophia, these had pendentives to carry the domes over the four arches that bounded each bay. Elsewhere, with other patrons, other variants of the domed basilica were tried, not always successfully, and there were further examples of the tetraconch arrangement, notably in S. Vitale in Ravenna where, in contrast to Hagia Sophia, the mosaic portrayed human figures.

## Later Byzantine Churches

It is impossible not to see the subsequent history of Byzantine architecture as an anticlimax. Invention did not cease, but the later churches lack the power and majesty and vigour of Hagia Sophia and its

# Chapter 10

# THE BYZANTINE EMPIRE

## Architectural Character

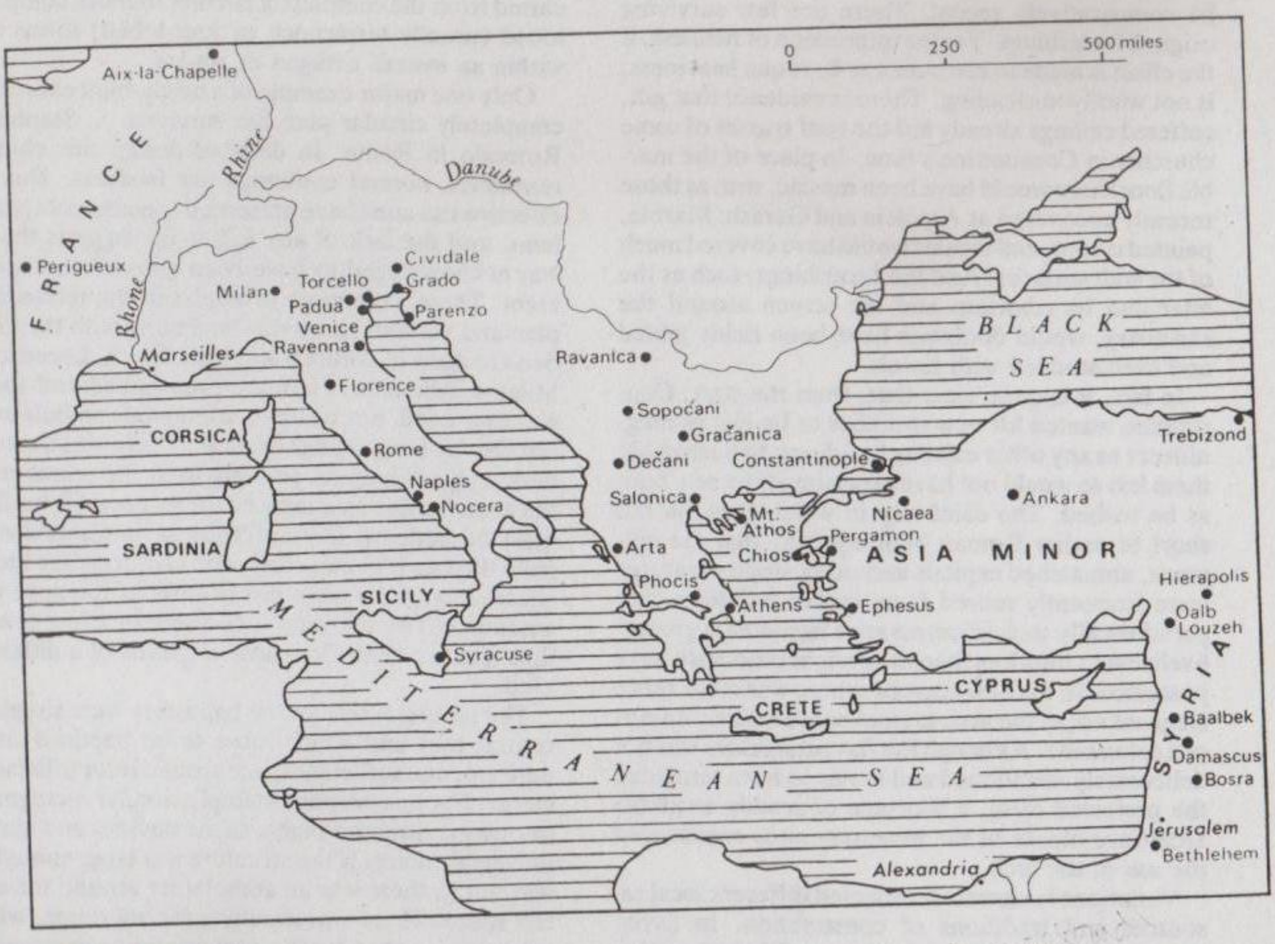
### Early Christian

Early Christian architecture was an integral part of the architecture of the later Roman Empire. Architecture in the service of the Christian church did not begin with Constantine's formal recognition of Christianity. Nor did large-scale secular building end with it. In Rome, for instance, Constantine was responsible not only for the first large new churches but also for the completion of the Basilica Nova begun by Maxentius, for the last large Imperial baths, and for several other projects of the kind undertaken by previous emperors, such as the construction of two monumental arches. In Constantinople, he undertook further secular buildings, as did his successors. But it was in new buildings for the church—places of worship, memorial structures and baptisteries—that the only new forms were created. It was chiefly these forms that continued to evolve in the following centuries, and it is in these that the chief interest of the period after Constantine lies.

The first Christians already had the synagogue as their place of worship, and, believing in an imminent end to this world, felt no need of anything more. When that expectation receded and they grew in numbers and largely severed their Jewish ties, they met for prayer and for their central act of worship—which gradually developed into the formalised liturgy of the eucharist—in whatever rooms could be made available to them by members of the group. They buried their dead, just as most of their pagan contemporaries did, and, like them also, met for commemorative meals at the cemeteries. In Rome, and in a few other places, these cemeteries were mostly underground catacombs. But there was no special significance in that: it was essentially a consequence of the high price of land and the favourable circumstance that there was an easily tunnelled rock just below the surface which permitted burials one above another down to considerable depths. Simple structures were built nearby to accommodate those sharing the meals.

By the third century, purpose-built churches or adaptations of existing buildings were being commissioned. But they were too small and architecturally insignificant—deliberately so in order not to challenge too blatantly the official state religion—to serve as a model for Constantine's architects. Nor could the pagan temple serve as a model: something distinctively different was needed to serve a different kind of use. When large numbers of people participated in the ceremonies associated with the temple they did so in the open air, but the eucharist called for a different sort of participation. It was one to which only initiates were admitted and was performed inside, where enough room had to be provided for all those taking part. Baptism also had its special requirements, as it was performed at this time by immersion. Only the tomb and the other provisions at the cemetery made no new demands.

Completely new types of building do not, however, come into existence overnight. Certainly they could not do so when it was even more necessary than it is today to rely on experience in all practical matters of design and construction. Constantine wished to make an immediate impact with his new church commissions, and so did churchmen who wished to take advantage of the new official recognition of Christianity. For the church building itself, therefore, the form chosen was that which was suitable with virtually no major modification, had few undesirable connotations arising from its previous uses and could be built rapidly at relatively low cost. This was the basilica as it was generally known, until it was reinterpreted by Maxentius in the Basilica Nova—a timber-roofed rectangular hall with a colonnaded central space with aisles and perhaps galleries above them. The main space, built higher than the aisle galleries, had clerestory lighting, and one or more apses in which legal business was transacted. It could easily be varied in size and precise form, and had already appeared in many such variations. The only real limitation was on the width of the central space, which had to be within the spanning capacity of known forms of timber roof. Seating could be provided in the apse for the clergy, as it had been for the magistrate and his assessors, and a Christian altar



The Byzantine Empire

could be placed in front where, previously, there had been a small altar for libations.

Thus the commonest form of the early church (and also of contemporary synagogues as seen, for instance, at Sardis) was a rectangular hall, timber-roofed, usually with one or two aisles to each side of the central nave, and with an apse at one end facing the principal entrances at the other. Corresponding roughly to the sacred enclosure in front of the temple, and to the atrium of a typical early Roman house, was a courtyard which was also referred to as an atrium and frequently had a fountain in the centre. One or more semicircular rows of seats were set against the wall of the apse for the clergy, with a raised throne in the centre for the bishop. An open screen in front of them marked off a sanctuary from the rest of the nave, and within this area was set the altar. To give it greater emphasis and dignity, it was usually surrounded by four or more columns and surmounted by a canopy, known as a baldachino or ciborium.

The impression given by the interior of one of these churches today, in comparison with surviving but less well preserved Roman buildings, is of great richness. Looking down the length of the nave, one sees long rows of marble columns, sometimes carrying flat entablatures, and sometimes rows of arches. Above these, and between the clerestory windows, the walls may be faced with marble, or sometimes with mosaics made up from small tesserae of coloured glass. There may be further iridescent mosaics on the 'triumphal arch' which terminates the nave proper, and on the semidome of the apse which opens into it. These mosaics, if surviving from the early period, will mostly be either narrative scenes from the Bible or single figures seen against stylised landscapes or plain gold grounds. There is likely to be a coffered and richly gilded ceiling to the nave, while on the floor there will be a pavement of grey-white and black marble, inlaid with geometric patterns of coloured marbles.

But it should be remembered that much of what is seen is often the result of later changes. The ceiling, for instance, is likely to be a Baroque refurbishment and the marble paving from the eleventh or twelfth century. Much of the facing of the walls will probably nearest contemporaries and successors. The reduced vigour and scale of new construction reflected a contraction of Byzantine power, a lowering of the sights, and a preference for satisfying the modest needs of monastic communities rather than for making great public statements.

The almost universal use of the dome and the associated adoption of centralised plans has already been referred to. Certain earlier plan forms were retained for a time, notably circular and tetraconch plans which are to be found on the eastern fringe of the empire, particularly in Armenia. The trend, however, was to contain the church within a square, with a dome over its centre, and usually four cross-like arms which might be either square-ended or apsidal-ended.

Plans initially differed chiefly in the way in which the left-over spaces in the corners of the enclosing square were filled and the relationships between them and the main central space. Usually, only the main apse containing the altar was allowed to project beyond the square, though smaller projections might be allowed in the two flanking corner spaces which contained secondary areas, known as pastophoria, used by the clergy. But there was less emphasis on the enclosing square in those more easterly regions which had remained Christian after the Arab conquests. In Armenia and Georgia, more frankly cross-shaped plans were also adopted. Finally, in Greece and Constantinople, the piers that supported the dome were reduced to single columns, and all the side thrust previously resisted by the piers was passed over to the outer walls. This unified the corner spaces with the central one and with the arms of the cross. But at about the same time it became the usual practice to enclose the sanctuary area in the eastern apse, and the two pastophoria, behind a much more substantial screen, the iconostasis; this change, which reflected changes in the performance of the liturgy, introduced a new spatial division.

In partial compensation for the contraction of the dimensions of the plan, heights were, in proportion, increased. This was done partly by raising the central dome on a high drum which, from inside, created a wholly different impression from that created by the wide-spreading dome of Hagia Sophia. A further change, perhaps partly responsible for this emphasis on height and certainly related to it, was an increased emphasis on the exterior. This was seen also in the grouped massing of other vaults around the central dome, and in decorative surface treatment of the brickwork or masonry of the walls.

Hagia Sophia, through the very nature of its internal space, its marble facings and its resplendent non-figurative golden mosaic, must have seemed to be almost a heaven-on-earth, and to have no real need of figurative decoration. None of the interiors of these later churches could have created anything like the same impression by architectural means alone. But their walls, and more particularly the curved surfaces of their vaults and domes, did provide suitable grounds for the creation of an iconic heaven in fresco or mosaic.

Monastic churches of the ninth and tenth centuries show how perfectly the possibilities were exploited, once the period when all human representation was forbidden came to an end in 843. With a kind of realism that is totally different from that of the illusionistic decorations of the seventeenth and eighteenth centuries, Christ and the Virgin were represented in the central dome and the conch of the apse, sometimes in scenes like the Ascension and sometimes majestically alone against a golden background. On the curved surfaces of the pendentives and other high vaults, the principal events in Christ's life, such as the Annunciation, Baptism and Transfiguration, were presented as if actually taking place in the spaces enfolded by these sufaces. On the walls lower down, closer to those present below, were figures of those of their predecessors who were now among the saints.

In churches built or decorated during the last centuries of the Byzantine empire, this rigorously hierarchic scheme tends to be abandoned in favour of an all-over decoration which is of a more narrative character and more like that of contemporary churches in the west, though in place of the boldness and otherworldliness of the earlier mosaics there was a new refinement and humanity which has parallels in western painting of this period.

A final characteristic of later church building is the frequency with which new churches or chapels were added to existing ones, possibly to economise in the numbers of clergy needed to serve them. This trend is particularly noticeable in Constantinople, where groups of two or three churches, often separated in date by several centuries, together create external combinations of form very different from the strictly organised massing of the single-dome church.

## Later Church Building in the West

The architecture considered so far has been essentially that of the undivided empire from the time of Constantine onwards, and that of the eastern or Byzantine empire from the time of Justinian. In the West, during the latter period, there were three types of church architecture which were closely related, either to the architecture of the early Christian phase itself or to later architecture in the East.

The first is the church architecture of Rome right up to the thirteenth century. Perhaps partly on account of limited resources, this displayed an almost unparallelled conservatism and led to its being classed simply as 'Early Christian'. Because of this conservatism, it is unnecessary here to consider the differences further, but they will be referred to again below in looking at representative examples.

The second is the church architecture of the western outposts of the Byzantine empire and places which maintained close ties with it, notably Ravenna and Venice, southern Italy and Sicily. In Ravenna and Venice, in churches like S. Vitale and S. Mark's, there are close reflections of the architecture of Constantinople, which even assist in visualising what has been lost in Constantinople itself. In southern Italy and Sicily the characteristics of the architecture of Constantinople were more subject to influences from elsewhere—Norman, Lombard, even Western Islamic—and were sometimes so modified by them that little remained of the style beyond the use of mosaic and certain details of decoration.

The third is western church architecture influenced either directly or indirectly by that of Constantinople. This is considered in later chapters.

## Secular Architecture

The secular building undertaken by Constantine, both in Rome and Constantinople, almost certainly was more extensive than his new church building. Similarly, Justinian embarked upon more secular than church work. A large proportion of it was for defence. With the general decline of city life after the sixth century the amount of non-ecclesiastical work must have diminished greatly, possibly more than did the building of new churches. But it did not end. For instance, new palaces and many new monasteries were built.

Since, even in Justinian's time, there appears to have been little significant development compared with the late Roman period, little needs to be added here, apart from observing that certain forms fell out of favour and that the resemblances between church architecture and the types of secular architecture on which it had been modelled remained close, except for the obvious differences in furnishing.

It has already been noted that the Byzantine empire had little use for the theatre and still less for the amphitheatre. The chief place for public entertainment was the hippodrome, virtually identical with the Roman circus. This also became the chief place of public assembly and the place where, in the capital, the emperor confronted the people in his special box. Baths continued to be built in much the same manner as before, and in fact the new baths erected much later by the Turkish conquerors still followed the Roman pattern. Works of civil engineering, such as aqueducts and reservoirs, also reflected Roman precedent, though Constantinople was provided with more underground cisterns than any previous city, and a characteristic form was developed for these with brick groin-vaulted roofs carried on long parallel rows of columns.

Byzantine domestic architecture has been studied far less than that of Rome and its provinces, but if it was significantly different from the latter it was almost certainly because of a regression in the standards of accommodation and construction. There are no Byzantine examples to compare with the insulae and separate houses of Rome, Ostia, Herculaneum and Pompeii, and this cannot be attributed to more widespread destruction. The older monasteries show that the living quarters had to be rebuilt periodically or were at least extensively restored, so that little remains of the early construction. The more soundly constructed, later palace-architecture, although in ruins, shows considerable western influence.

# Examples

## Early Christian Religious Architecture

Though the examples under this sub-heading are chiefly those defined earlier as Early Christian, it is convenient to include with them a few examples of the continued use of similar forms in the time of Justinian and later. As the categories of church, commemorative structure or martyrium and covered cemetery overlap they are grouped together, leaving only mausolea and baptisteries for separate consideration.

### *Churches, Commemorative Structures and Covered Cemeteries*

The **Lateran Basilica (S. Giovanni in Laterano), Rome** (*c.* 313–20) (p.275B), was Constantine's first church commission in Rome. Erected on the eastern outskirts of the city on the site of a former military barracks, it was built as the cathedral of the Bishop of Rome. It was later remodelled several times, notably by Borromini in the seventeenth century, and again in the nineteenth century. Enough of the fourth-century church has survived at foundation level and in the form of earlier records to permit a precise reconstruction. It was a basilica with a wide central nave terminating in an apse, double aisles at each side (of which the inner were taller than the outer), and shallowly projecting wings which cut short the ends of the outer aisles and probably served a purpose similar to that of modern sacristies. The tall nave colonnades carried horizontal entablatures and those of the lower aisles carried arcades. There were no galleries. Early records speak of gilt roofs or ceilings, silver altars, and silver and gold candlesticks as well as coloured marble columns and wall-facings—all contrasting strongly with what must have been a very plain exterior.

Closely contemporary with the Lateran Basilica were a number of new cathedral churches elsewhere which are known only from excavations or descriptions. Among these, the **Cathedral of Tyre** (consecrated 316 or 317) shows that, even outside the part of the empire then under Constantine's jurisdiction, a very similar basilican form could be adopted. According to Eusebius, this church had only two aisles, but his description refers also to an atrium with a fountain in its centre, approached from the street through a monumental propylaeum.

If the emphasis placed upon it by Eusebius may be taken as a guide, the **Church of the Holy Sepulchre, Jerusalem** (p.275E), was Constantine's most important church foundation in the East. Its present form is the result of several major reconstructions and adaptations, most notably in the twelfth century by the Crusaders who built the Gothic choir and the tall entrance facade on one side. Recent excavations have done much to clarify its original form, which was not fully achieved until near the end of the fourth century. It consisted of several related structures: the **Anastasis Rotunda** rising over the tomb; a porticoed court embracing, in one corner, the Rock of Calvary; the **Memorial** or **Martyrium Basilica**, serving also as the cathedral; and an outer atrium. This last—irregular in shape because of the nature of the site and the pre-existing structures on it—was approached from the street, as in Tyre, through a propylaeum. The basilica was shorter in relation to its width and had galleries as well as double aisles on each side. The precise form at the altar end is not yet fully established. In his description, Eusebius refers to its being 'encircled by twelve columns', and it is possible that they were set rather tightly against the curved wall of the apse, like those in the apses of the basilica at Leptis Magna. Another possibility is that they belonged to the altar ciborium.

Somewhat similar, but simpler because there was only a single holy site to be enclosed, was the parallel Constantinian foundation of the **Church of the Nativity, Bethlehem** (p.275D). This was rebuilt in the latter part of the sixth century, and the present basilica dates essentially from that rebuilding. It terminates in a large triconch arrangement, comprising a central apse and two similar apsidal transept arms, below which is the Grotto of the Nativity. The nave and aisles of the original basilica probably did not differ greatly from the present ones, but, in place of the triconch termination, they opened into a large octagon, probably with a conical roof, over the grotto.

Back in Rome, Constantine undertook the construction of his largest work of this kind, to commemorate the principal apostle and honour his tomb. This was the **Basilica of S. Peter** (*c.* 320–330) (p.275A). Again the church that is seen today is a rebuilding, in this case to a totally different design and on a substantially enlarged scale. The original church survived without much change until towards the end of the fifteenth century, however, and the nave for almost another century, and there are ample remains of its foundations below the present floor as well as numerous sixteenth-century drawings to give a full picture of its form (p.277A). Only the details of the atrium are not certain.

The church was constructed over a cemetery which extended along one side of an earlier circus; since there was a considerable slope, one side was constructed above the tombs of the cemetery and the other side cut into the hill. A ciborium-like canopy, whose barley-sugar twisted columns are now set into the great piers that carry Michelangelo's dome, was erected over the tomb believed to be that of S. Peter. A broad raised platform, or bema, extended to each side of this, and an apse projected behind it (westwards, on account of the topography of the site). In front stretched the basilica, some 64 m (210 ft) wide with its double aisles on each side, and some 90 m (295 ft) long, not counting the bema and apse. Twenty-two huge antique columns, varying in size and colour and with equally varied capitals, supported the nave walls on a horizontal entablature as in the Lateran Basilica, while similar numbers of shorter columns carrying arcades divided aisle from aisle.

S. Peter's seems to have differed from the churches considered hitherto in having had, originally, no permanent altar. The reason for this is that a second function of the church, and probably the chief justification for its size, was to serve as a covered cemetery. Bema, as well as nave and aisles, would normally have been given over to pilgrims and to those coming to commemorate their own dead. The floor was carpeted with graves, and records refer to funeral banquets being held over them as late as 400. The funerary character of the structure is also attested by the large mausolea attached to one side.

The covered cemetery of **S. Agnese, Rome** (*c.* 340 onwards) (p.275C), is one of several more normal representatives of this type of architecture. Part of it survives, situated between the sixth-century church of the same name and the mausoleum of **S. Costanza**, and the plan—of the typical form already referred to—has been more fully disclosed by excavation. Of the other similar structures, that of **S. Sebastiano** (probably begun *c.* 313) seems to have been the first, and is the one whose exterior is most crowded by separate mausolea. These structures were built over catacombs containing the tomb that gave the site its special significance, but not directly over the tomb itself, to which there was separate access. When it became desirable to improve this access and provide more accommodation for pilgrims, the tomb was exposed by excavation and another basilica built over it. Where the nave was below ground level, it was provided with a gallery, as in the later church of S.

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**SS. Sergius and Bacchus, Constantinople** (possibly begun *c.* 527, completed before 536) (p.294E), was a much more modest structure, but has survived largely intact, though its dome can hardly be the original one. Its plan is a development of the tetraconch form with surrounding ambulatory which had been seen at places as far apart as Milan and Bosra, and may have had a precursor in Constantine's Golden Octagon. An octagonal core is expanded on the four diagonal sides by exedrae, and the east and west sides are open, respectively, to the chancel and towards a narthex. There is a gallery over the ambulatory. The church was commissioned by Justinian to stand alongside the palace he occupied before becoming emperor, and there is a strong likelihood that it served, in part, as one model for the design of Hagia Sophia. There is a remarkable lack of geometric precision in its setting out, though this may have resulted partly from the nature of the site and the prior existence of other buildings to which the church was joined. Inside, beneath Turkish whitewash, the fine carved detail of capitals and frieze is still visible. The building is now a mosque and the furnishings are those appropriate to this use.

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**Hagia Sophia, Constantinople** (532–7) with later partial reconstructions and additions) (pp.287–290), was Justinian's principal commission. The dedication to Hagia Sophia (Divine Wisdom) was really a dedication to Christ, and the church was also known simply as Megale Ecclesia (Great Church). It stood on the site of two earlier churches at one end of the ancient acropolis, alongside the principal square of the city—the Augusteion—and only a short distance from the imperial palace. The first church, founded by Constantius, was dedicated in 360 and burnt in 404. It was rebuilt under Theodosius II, rededicated in 415, and burnt in the Nika riot of January 532. Both these churches were, almost certainly, basilicas with double aisles and galleries like the Martyrium Basilica in Jerusalem and S. Demetrius in Salonika, though larger than either. The second church, at least, was preceded by an atrium that was entered through a monumental propylaeum. As Constantinople increased in importance and its bishop became the patriarch of a large part of the Eastern Church, Hagia Sophia became not only the cathedral but also the patriarchal church.

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Justinian's church was designed by Anthemius of Tralles and Isidorus of Miletus—men with a deep knowledge of the mechanical science of the day who are referred to, not as architects, but as *mechanicoi* or *mechanopoioi*. That science was, however, more akin to the geometry of today than to the science of the modern engineer, and it is the masterly geometric ordering of the space and the vaults that cover it that is most apparent from a detailed study of the design. Statically, the design was not completely successful, because the dome partly collapsed barely 30 years after completion and had to be rebuilt to a modified design. But that collapse was at least partly attributable to the great speed of erection, far exceeding that of any comparable later structure, and to an unusual sequence of earthquakes in the intervening years. It is also necessary to bear in mind that the design went far beyond previously proven practice.

The main body of the church is enclosed within a rectangle almost 70 m (230 ft) wide and 75 m (245 ft) long, with a projecting apse at the east end and double narthexes preceded by an atrium at the west end. In the centre of this is a square whose sides measure exactly 100 Byzantine feet (31.2 m). Over it sits the dome, carried on pendentives which bridge between great semicircular arches carried on piers standing just outside the square. Other piers face these piers across the aisle to help resist the outward thrusts of the dome to north and south. To the east and west the arrangement is different, and was even more novel than the use of pendentives to convert the central square to a circle. Here, butting against the transverse arches that carry the dome, are two semidomes equal in diameter to the dome itself and carried partly by further piers set against the outer east and west walls. These piers finally take the thrusts to east and west, but at a lower level where they are potentially less damaging. Below the semidomes are great hemicycles that double the east-west extent of the nave. Between the main piers and the secondary piers just referred to, these hemicycles open into smaller semicircular exedrae similar to those in earlier tetraconch churches. Single aisles run from end to end at each side (p.291), narrowed somewhat by the main masses of the piers and narrowed further by pairs of inward projections from the piers that have been shown to be additions to the original design made at a late stage of construction when the horizontal forces generated above had begun to push the piers aside in an alarming way. Because of the presence of the great hemicycles and the exedrae at the east and west, their inner boundaries are very different in their different bays. They communicate at the west with the inner narthex. Above them and above the inner narthex are similarly shaped galleries.

Partly to carry the aisle and gallery vaults, arched colonnades run between the piers around the nave, and further columns stand within the aisles and galleries. All have monolithic shafts, encircled at top and bottom by bronze collars where, in classical columns, there would have been integral projecting neckings. The shafts within the aisles and galleries are of white Proconnesian marble; those around the nave are of green Thessalian marble or red porphyry, the latter only in the exedrae at ground level. They carry superb capitals of several different designs, all of which incorporate integral impost blocks. These capitals, as well as the carved cornices and similar features, were clearly cut for the purpose. So were most of the shafts, despite significant variations in size and the legends of provenance from earlier temples. But the porphyry shafts vary more in size than the others and do seem to have been reused. The arrangements are similar at the two levels, except that the colonnades that run around the nave at gallery level—both the straight central colonnades and the curved ones around the exedrae—are not only lower than those below, as might be expected, but have more columns and closer column spacings.

Above the second cornice, which runs unbroken around the entire church, are the springings of the main semidomes, smaller semidomes over the exedrae, and the arches that carry the dome. The semidomes were all originally quarter spheres, though the western main one now has a flattened crown and rises more steeply up to it. All originally had five window openings, some of which are now blocked. Below the main arches at north and south are window-filled walls known as tympana. These have been reconstructed, the window area originally having been greater—with a large single window in the upper part. Forty windows originally lit the dome, four of which are now blocked.

The main structure was partly built of large well-fitted blocks of limestone and a local granite, and partly of brick, of the usual Roman flat tile-like proportions. Ashlar was used for the lower parts of the piers, but it gave way to brick at the higher levels and for all vaults even at ground level. A notable characteristic of the brickwork is that the mortar joints were almost as thick as the bricks. This must have contributed greatly to the early large deformations and the subsequent partial collapse of the dome.

The plan is most notable for the way in which the longitudinal emphasis of a basilica is combined with the centralising emphasis of the dome. Detailed study of the setting out shows how the two were brought together. Not everything in the design was as deliberate, however. The unpremeditated addition of stiffening projections from the piers has already been referred to. There is evidence of improvisation in the vaulting of the aisles and galleries, particularly of the irregular spaces next to the nave. Most revealingly, it appears highly likely that the lack of correspondence between the colonnades at ground and gallery levels around the nave was also not originally intended.

Entering the church today (now a museum after more than nine centuries as the principal church of the Byzantine empire, and almost five centuries as a mosque) there is much that must be discounted and much that has gone that must be borne in mind (p.288). Multi-coloured marble facings remain largely undisturbed on most of the surfaces of the piers visible from the nave and much of the original gold mosaic on the aisle and narthex vaults. At the higher levels, however, one is mostly confronted with badly discoloured nineteenth-century painted plaster. Much of the natural light that would have originally flooded the interior has been blocked by the filling-in of windows and the construction of bulky buttresses against the outer walls. All the original fittings for lighting Hagia Sophia after dark disappeared long ago, as did all the original furnishings clad in gold and silver and studded with precious stones.

Within the nave, the overall impression is of a single surface which envelops walls, colonnades and vaults—a surface that is divided into horizontal bands by the colonnades and cornices, sometimes disappears from sight, and is far from impenetrable, but barely hints at the great mass of the piers that actually sustain the dome (p.290A, B). Within the aisles there is an even more lively complexity resulting from the varied bay shapes, the juxtapositions of columns of varying types, colours and heights, the changing glimpses of the nave as one moves about, and the contrasts in light. What is most difficult to envisage is the focus that would previously have been provided by the canopied altar rising behind a chancel screen projecting well forward between the eastern exedrae, the great ambo set further forward under the dome and connected to the chancel by a screened passageway, and the colour, movement, singing and incense of the sacred liturgy—a liturgy in which the emperor himself took a formal part on great feasts. In partial compensation, there are now, over the south door of the inner narthex, over its central door into the nave, in the apse semidome, and in various positions on the walls of the galleries and above, fine figurative mosaics added after the end of iconoclasm in the ninth century.

Outside there is much more to be discounted to arrive at the original form with its large areas of glazing and marble facings on at least some of the walls (p.287B). Originally, the dome was lower than at present, and the square base on which it stands did not rise up quite as high. Both main semidomes were reconstructed in later centuries (the western in the tenth century and the eastern in the fourteenth), and the form of the western one was changed in the manner already noted.

Most notably, there have been many additions to the exterior, initially to provide additional buttressing to the dome and other high vaults, then in the sixteenth century and later to make fuller provision for use as a mosque. Among the first additions were buildings of the patriarchal palace situated against the south-west corner of the church and along its south side, and of flying buttresses set against the wall of the outer narthex and spanning over its roof to abut the wall of the west gallery. Their date has not been precisely established, but they were probably added in the ninth or tenth century, well before the use of similar forms in Gothic architecture in the West. When the church was first completed, the upward continuations of the piers to the north and south of the dome as great buttressing arms above the gallery roofs would have been even more conspicuous than they are today.

Apart from the additions, there have been major losses. Most of the atrium has disappeared, for instance, replaced now by a museum garden. Once inside the outer narthex, one can nevertheless still experience, much as before, the thrill of moving into the much taller inner narthex and then through one of its great doors into the nave—noting that most of the doors do not, and never did, line up with one another.

Finally, it is worth noting that there were no pastophoria within the church. Previous attempts to identify areas adjacent to the apse as the prothesis and diaconicon—or sacristy and vestry—have been shown to be mistaken. Though such provisions were made at the time inside some churches, they were not called for here. Priests robed before they led a mass entry of the congregation into the church from the atrium and narthexes. The elements for consecration in the service were prepared in a separate structure, the skeuophlyakion, which is situated a little to the north, and which is the principal survival from the church of Theodosius II.

**S. Vitale, Ravenna** (built *c.* 540–48) (p.294D), was commissioned at some time between 521 and 532, during the period when Italy was ruled by the Ostrogoths, but cannot have proceeded far until a decade later when the city had fallen to Justinian. Even before that, there was close contact with Constantinople, so that a strong Byzantine character is not unexpected. The resemblance to SS. Sergius and Bacchus is obvious, though the impressions created by the two interiors are dissimilar, chiefly as a result of the different relationships between height and width; there is a similar contrast between S. Vitale and the later, and proportionately even taller, derivative church built by Charlemagne at Aachen, now Aachen Cathedral (q.v.).

Like SS. Sergius and Bacchus, S. Vitale has a domed octagonal core surrounded by a ground-level ambulatory with a gallery above it. The diameter of the core is greater, but by less than a metre. Yet the crown of the dome is some 6 m (20 ft) higher, and the impression of height is reinforced by an emphasis on the verticality of the piers, which contrasts with the emphasis on horizontal continuity created by the deep cornice which runs unbroken across the faces of the piers at gallery level in SS. Sergius and Bacchus. As in the latter, there are exedrae opening off the central space, but now there is one between each pair of piers, except at the east end, where again there is a deeper opening terminating in an externally projecting apse. The outer wall of the ambulatory is octagonal, presumably because this was more logical and because there was no constraint, as there was at SS. Sergius and Bacchus, arising from the proximity of existing buildings.

Other contrasts between the two buildings are in construction and decoration. The chief constructional difference is that the dome of S. Vitale is formed of hollow tubes, like the Orthodox Baptistery already referred to. Over it is a tiled timber roof, whereas the normal practice in Constantinople was to cover vaults and domes with lead laid almost directly on the brickwork, so that their forms were clearly expressed externally; it was only by raising the dome on a drum that it could be given greater height. Internally, the fact that S. Vitale has always been a church has allowed it to retain most of the original mosaic that covered the upper parts of the walls and the vaults of the chancel. Here are life-size representations of Justinian and his equally remarkable consort, Theodora—the first shown as if entering the church with the bishop and other clergy and his own entourage for its consecration, and the second with the ladies of her court standing in the atrium as if about to enter.

**Hagia Irene, Constantinople** (begun 532 or shortly after, but extensively reconstructed after 740), replaced a church which was the cathedral before the first Hagia Sophia was built, and which was badly damaged by fire in 532. It stands not far from Hagia Sophia and was served by the same clergy. Now, only the lower parts of the walls belong to Justinian's rebuilding: the galleries and vaults were reconstructed after earthquake damage in 740, and there have been further subsequent changes. It seems most likely that, in Justinian's church, there was a single dome over the main square bay of the nave in front of the apse, and that there were barrel vaults spanning from side to side further west. Thus the form would have been a vaulted equivalent of that at Alahan Manastir, though on a larger scale and with the addition of galleries. Part of the present interest of the church lies in the iconoclastic mosaic in the semidome of the apse, and in the well-preserved synthronon—the stepped seats for the clergy—below. After a long period as an armoury, the church has now had most of its interior stripped bare.

The **Holy Apostles, Constantinople** (*c.* 536–65), was Justinian's rebuilding of Constantine's church. After several later partial rebuildings and remodellings, it was swept away after the Ottoman conquest to make room for the first Fatih Mosque. Nothing is known of it other than from descriptions, representations in illuminated manuscripts, and later copies. Apparently it was cross-shaped in plan, like its Constantinian predecessor, but with a dome over each arm of the cross and a taller dome over the crossing. S. Mark's, Venice, is possibly the closest copy.

**S. John, Ephesus** (before 548–65) (p.295E), was Justinian's other major church rebuilding. The earlier church was enlarged and, like the Holy Apostles, vaulted throughout with a series of domes—the chief difference here being that the west arm was longer than the others and called for two domes. The excavated (and now partly reconstructed) remains show that the manner of construction closely resembled that used in Hagia Sophia, with fine ashlar piers and brick arches and vaults.

## Chapter 32

# BACKGROUND

## Introduction

For this part of the book the amount of background material required varies from region to region. Thus, for example, the general descriptive and locational material for Australia and New Zealand, which now appears for the first time, is fuller than for Africa or south-east Asia, which have already received attention in Part 4, Chapter 18.

To reiterate a point made elsewhere in the book, divisions which rely upon living political and cultural movements are intended here only as convenient labels in so far as they make the architecture of towns and cities more comprehensible in the context of vastly increased building activity in the service of growing populations (see Introduction, pp.xx–xxi). Some of the continuities are made apparent: for example, the far-flung activities of the European maritime nations, as ship-building technology and cartographic and navigational skills improved, resulted in the diffusion of European architectural styles into the Americas, around the coasts of Africa, India and south-east Asia even in the early and middle years of the seventeenth century, when, in some cases, the motivation was trade in precious or exotic commodities, in others discovery for its own sake. See Plates 6 and 7.

## Africa

Savannah and steppe grasslands extend over more than half the African continent, stretching from the Atlantic coast of Senegal and Guinea right across to Ethiopia, roughly 2000 km (1240 miles) to the north of the equator, and almost 3000 km (1860 miles) to the south as far as the Tropic of Capricorn. Further to the north the Sahara desert extends from east to west, giving way to a fertile region along the Mediterranean coast. To the south-west of the great savannah area is the Kalahari desert, contained roughly within Botswana, and the Namib desert which extends along the Atlantic coast of South West Africa (Namibia). To the east of the Kalahari desert are the highland region of Transvaal and low-lying Mozambique, while the rest of South Africa down to the Cape of Good Hope is once again Mediterranean in character. Tropical rain forest extends along the equatorial region of the West African coast from Sierra Leone through Ghana and Nigeria, until it expands to take in the whole of the Congo basin; a smaller belt is found further south along the line of the Zambesi river.

Bisected by the equator, most of Africa is always hot. In the tropical rain forest, as the name implies, rain falls frequently and heavily, and it is always humid. Outside these areas the rainfall is normally concentrated in one short season which produces extensive flooding and soil erosion. The soil of the savannah is poor and generally infertile, leached as it is of minerals by the rainfall, and lacking in humus which is oxidised by the heat. The better-watered, lower and hotter regions support a heavier vegetation of deciduous woodland. On the upper, drier zones of eastern and southern Africa open downland provides fine grazing. The vast Sahara desert causes the Harmattan to bring dust to West Africa from November to March, but its dryness alleviates the generally humid climate.

Iron oxide is present in most tropical soils, and it was from Egypt that the use of iron penetrated into what is now Sudan, spreading gradually through the middle continental belt and then south towards the Cape of Good Hope. Copper is found in the desert of Mauritania and Niger, but to a greater extent in southern Zaire and northern Zambia. Both minerals formed part of an extensive traditional trading network, but gold and diamonds were of far greater importance, and it was the former that drew traders to the continent in the fifteenth century. Goldfields were being developed in Zimbabwe as early as the closing years of the Early Iron Age, and there was a long-established trade in gold to the towns of the Indian Ocean, and thence to Arabia or India. Equally, gold had been the most valuable product in the trans-Saharan caravan trade from West African goldfields, principally those of Bambuk between the Senegal and Faleme rivers, of Bure in north-east Guinea, of Lobi on the edge of the tropical forest could easily be offloaded from ships. Missionaries introduced corrugated iron for roofing in the 1850s, and it found favour as a precaution against fire hazards. In the 1860s they set up a brick kiln in Lagos, Nigeria, and provided an alternative to the ubiquitous earth as a walling material. By the late nineteenth century there was a steady demand in such towns as Zanzibar for steel beams, cast-iron columns and brackets, and other European materials which were considered desirable embellishments of the vernacular buildings. In the prosperous South African colonies there was a much greater reliance on imported materials for walls, roofs, cast-iron verandah poles and decorative tiling; and when the prefabrication of faience facades was perfected in Britain, these too were shipped out.

The 'scramble for Africa' by most European powers in the last quarter of the nineteenth century introduced another factor. The Anglo-French agreements arising from British seizure of Egypt and the Suez Canal, the taking of a large part of central Africa by Belgium, the acquisition by Germany of parts of West and East Africa, the division of Morocco by France and Spain, were all symptomatic of the rapid growth of western European capitalism and the parallel rise of European nationalism and imperialism. In architectural terms this was often expressed in the styles chosen for the colonial buildings, such as the German government buildings in Dar-es-Salaam. In South Africa, where great wealth had been brought by the mining of gold and diamonds in the 1880s, Sir Herbert Baker's Union Buildings in Pretoria, like his later buildings in New Delhi, were symbolic of early twentieth-century imperial idealism.

## The Americas

From the island bases originally secured by Columbus before the end of the fifteenth century, the Spanish pursued a policy of conquest and settlement in Central and South America. By 1600, as well as the islands of Santo Domingo and Puerto Rico, they had taken the whole of Central America as far north as the extent of present-day Mexico (Viceroyalty of New Spain), a substantial strip running the length of the west coast of South America, modern Peru and Chile (Viceroyalty of Peru), and later in Central America the Viceroyalty of New Granada (1739) and in the south the Viceroyalty of Rio de la Plata (1776). The Portuguese under their agreement with Spain limited their conquests to Brazil, and by 1600 had established their claim to an area which lay east of a line from just north of the mouth of the River Plate to the Amazon delta.

The Spanish colonists made little impression on the more easterly areas of the North American mainland, however. Their territory was limited to Florida, owing to the rival incursions, by the early years of the seventeenth century, of other European powers. The French had penetrated deeply south from the S. Lawrence down the Mississippi basin, and were on the Gulf of Mexico by 1682. The British were early on the eastern seaboard: Virginia by 1607, pilgrim fathers in New England in 1620 and more extensively after the Anglo-Dutch wars (1652–73). Their colonial settlements extended from Virginia to Nova Scotia and Newfoundland by the early eighteenth century, by which time the total population of the twelve English colonies was of the order of one-quarter of a million.

The products of the Spanish colonies in America were precious metals and cattle, of the Portuguese in Brazil sugar and other crops; apart from furs in the north, the British and French grew cotton and tobacco using slave labour in the south—some 100,000 slaves by the time of the American War of Independence. The Spanish and Portuguese relied upon Indian labour. It was autocratic control on the part of the European governments as well as unrest in the colonies themselves which led to the gradual break-up of the American colonial empires from the last quarter of the eighteenth century and through the nineteenth. This movement was initiated in the British colonies of the eastern seaboard of North America.

In 1774 representatives of the colonies met in Philadelphia as the First Continental Congress to discuss their relationship with Britain, especially with regard to taxation and trade, an event precipitated by the decision of the British government to close the port of Boston after angry colonists had refused to permit the landing of a shipment of tea on which they considered the tax unfair. The following year discontent flared up into open revolution which, with the adoption by the thirteen colonies of the Declaration of Independence, became in 1776 the American War of Independence. Peace came in 1783 and, with it, recognition of the independent status of the former colonies.

These at first formed a loose federation of separate republics, but in 1787 a constitution was drawn up whereby individuals became, for certain purposes, citizens of the federation itself and, for others, citizens of a particular state. The constitution, which remains in force today, was ratified in 1789. George Washington, the famous general of the War of Independence, was installed as first President of the United States of America in the same year.

From this point the history of the country was one of expansion. In 1803 the base area between the Mississippi and the Rockies was purchased from France (the Louisiana Purchase), and in 1819 Florida was similarly acquired from Spain. Texas was annexed in 1845 and, as a result of the ensuing war with Mexico, the south-western part of the country as far as the Californian coast was absorbed in 1848.

Volta river, and of Akan in the heart of the id nearest to Elmina. It was gold from the nes that was exported to the trading posts set e coast by the Portuguese and other Euro- wers from the fifteenth century onwards. s discovered in the Transvaal, South Africa, 50s; but it was not until 1886 that its extent in on was realised and the rush began which, her results, led to the founding of Johannes- e discovery of a superb white diamond of 85 ne Star of Africa) near the Orange river in ealed the continent's other precious natural —'the rock on which the future of South ill be built'. Then followed the rush to the ree State, the growth of Kimberley, and the of Cecil Rhodes, who saw his diamond s the foundation on which to build complete ominion in Africa.

gh European influence in the fifteenth and centuries had atrophied, Muslim develop- tinued along the Mediterranean coasts and felt in some areas of eastern Africa as the ent of Ghana, Mali and Songhay continued haran Africa. It is important to note that the pean incursions were contemporary with ents such as these—the great Madrassa of aitbay in Cairo had not yet been started Portuguese fortified their first settlement st coast of Africa.

il's merchant adventurers of the fifteenth enth centuries reintroduced European ar- to the African continent after the long ince the last Byzantine outpost on the nean coast had fallen to the Muslims in AD e had been an attempt by Genoese explor- around Africa and reach the Indies by way lantic in 1291, but the first Europeans to vere the Portuguese. In 1443 Henry the reached Arguin on the southern fringe of a Desert, where the first trading post was Twenty years later the Portuguese had e mouths of the Senegal and Gambia, and 71 their navigators landed on a stretch of African coast which they named Elmina, . Gold, ivory, gems and spices were the goal, and defensible buildings were an equirement in their trading activities.

ot only in West Africa that the Portuguese l trading posts and built forts. At about the as they built their first castle at Elmina ttled at Malindi on the coast of East Africa Fort S. Sebastian on Mozambique Island. of the sixteenth century they constructed close to the old Arab town of Mombasa ategic point overlooking the best harbour t. But by the early seventeenth century the pean trade had been taken over by the o continued to build forts along the West ast; and in 1650 the Dutch East India Company decided to set up a station at the Cape of Good Hope at the most southerly point of the continent.

The trading forts on the west and east coasts sometimes attracted the building of merchants' houses close by, but they were seldom colonies in the general meaning of the word. However, a colony was quickly established on the Cape, and characteristic town houses were built in Cape Town as well as homesteads or farm houses in the surrounding countryside. These were closely based on Dutch precedents. As the colony prospered, public buildings and churches were erected; and by the last quarter of the eighteenth century identifiable architects were working in Cape Town.

The Dutch East India Company was dissolved in 1793 when the Cape was occupied by the British, who handed it back to the Dutch State in 1803, but took it back in 1806. At about the same time, Napoleon's campaigns of 1789–99 in Egypt were forging a link between France and Egypt which was to result in a strong French interest in Egypt and North Africa generally. In 1830 France occupied Algeria where she imposed characteristic policies on the replanning of the old city of Algiers. In 1883 she established a protectorate over Tunisia, and twenty years later turned her attention to Morocco.

After Britain had finally taken over the Cape Colony in 1806, English architectural taste gradually modified the Dutch influence, in public buildings as well as in houses; nor was this confined to buildings. It was as a result of this influence and the insistence on driving English ways and beliefs into the Boer culture that the Afrikaners undertook the Great Trek of 1831–8 which eventually led to the foundation of the Boer Republics and, incidentally, to some distinctions between the later nineteenth-century architecture in the British colony and the new republics. But in both the buildings were often hardly distinguishable from their European counterparts, although there were some specifically South African characteristics in planning and in such external treatment as the lavish use of iron verandahs and balconies.

Meanwhile in East and West Africa mission stations were established by various European organisations throughout the nineteenth century in succession to the earlier Portuguese and Spanish missions; it was they who were largely responsible for introducing European architecture, even it had to be modified by the resources available. In building their churches and mission houses they sometimes combined national architectural characteristics with indigenous materials and methods of construction; and in developing appropriate houses for tropical countries they often displayed some ingenuity, in particular the Basel Mission.

The introduction of the railway led to a gradual diffusion of imported building materials, which had been confined at first to the coastal areas where they

gon territory in the north-west was ceded by Bri-
in 1846, and small areas of Mexican territory
ed by the Gadsden Purchase of 1853. Finally,
ska was bought from Russia in 1867.
anada, which had remained loyal to Britain dur-
the War of Independence, consisted of the four
nies of Upper and Lower Canada (both created
91), Nova Scotia and New Brunswick. Antagon-
etween Lower Canada, predominantly French,
Upper Canada led to a revolt in 1840, as a result
hich Britain granted the colonies a broad con-
tion, providing for a parliament and the appoint-
of responsible ministers, the British Governor
ning a purely legal and symbolic role. With the
ng of the British North American Act in 1867,
ountry was granted full Dominion status, which
ains within the British Commonwealth today.
anadian Parliament and Ministries were set up
tawa, the national capital, on the lines of those
estminster. To the original four provinces of
io (Upper Canada), Quebec (Lower Canada),
Scotia and New Brunswick, were added Man-
(1870) and British Columbia (1871), former
ries of the old Hudson Bay Company, and
in 1905 the prairie provinces of Saskatchewan
lberta.

atin America the viceroyalties of Spain and
al came to an end during the first quarter of the
enth century; after the failure of efforts to
he former colonies into a federation similar to
the USA, the subcontinent became separated
omplex of independent states, which has sur-
eographically unchanged to this day. During
tormy years of revolution and formation im-
roles were played by Simón Bolivar (1783–
Colombia, Venezuela and Ecuador; by San
(1788–1850) in the Argentine and Peru; and
nardo O'Higgins in Chile. For a variety of
, mainly economic, the more stable countries
e Argentine, which owed much to its presi-
neral B. Mitre (1862–8) for his encourage-
railway building; Chile with its vast nitrate
; and Brazil. Modernisation of the last began
e Portuguese Regent (later John VI), forced
leon's invasion of Portugal to move his capit-
de Janeiro in 1808. In 1821 John returned to
and Brazil became a separate kingdom
s son, Pedro I. The latter abdicated in 1831 in
his infant son, who as Pedro II took over the
1840. His long reign was marked by much
progress and reform, including the abolition
in 1888. In 1889 an army revolt established
c, which in 1891 adopted a federal constitu-
e United States of Brazil.

obtained her independence in 1821, but in
involved in bitter civil war. Supported by
he Austrian Archduke Maximilian was in-
Emperor in 1864, but three years later,
the withdrawal of French troops, he was
shot and the patriot Benito Juarez (1806–72), a Zapotec Indian, reassumed leadership of the country. But the creation of modern Mexico was left to Juarez's successor Porfirio Diaz (1830–1915), who ruled from 1876 to 1911.

Economically and socially the most advanced nation in the continent was the USA, where a sense of national identity had been reinforced by the war with Britain of 1812–14. By 1840 the country's trade was worth 250 million dollars per year, almost half being earned by the State of New York. Pennsylvania developed rapidly as her extensive coal and iron resources were exploited, but the main wealth of the country still lay in cotton, of which Louisiana's exports in 1840 were valued at 33 million dollars.

The presidency of Andrew Jackson (1829–37), a representative of the new frontier men, gave impetus to wider democratic ideals and greatly encouraged individual enterprise, while the farming prospects of the great tracts of land beyond the Alleghenies attracted increasing numbers of settlers, the westward movement being dramatically accelerated by the discovery of gold in California in 1848.

The coming to power in 1861 of an anti-slavery government under Abraham Lincoln (1809–65) brought to a head the rivalry between the more dynamic northern states and the cotton-producing southern states, with their long-established plantation system based on slavery, and kindled the tragic Civil War (1861–5), during the course of which, in 1863, slavery was abolished. The victory of the northern states, and of the union, was decisive for the future of the country and encouraged industrial development, which in turn greatly increased the rate of immigration.

Generally the period following the Civil War was one of continuing commercial expansion, an age offering great opportunities and high material rewards to individual industrialists, bankers, farmers and railway owners. This situation, clearly reflected in the architecture of the time, continued until the financial crash of 1929 and the ensuing depression. The opening-up of the country by railways was essential to development, and the continent was finally traversed by rail from coast to coast in 1869. Alexander Graham Bell's invention of the telephone in 1876 further facilitated communications across the vast country which was also linked to Europe by transatlantic cable. Finally the mass-production of the motor car between the two World Wars further extended communications and movement.

As far as industry was concerned, Canada's development was much less rapid, her economy being based almost entirely on the export of timber and wheat. As in the USA, communications were of utmost importance: in 1847 improvements were completed on the S. Lawrence between Montreal and Lake Ontario, while the Canadian Pacific Railway had straddled the continent by 1885.

Like Canada, the countries of South America relied on the export of natural products rather than on manufacturing, and the opening of the Panama Canal in 1914 was of great significance in the development of the countries of the Pacific coast.

The architecture and the materials and techniques used in its realisation in the Americas by the colonists and settlers, as in other parts of the world, reflect faithfully the architecture of the corresponding periods in the home countries. From the splendid churches and cathedrals of sixteenth-century Spanish colonial cities in which masonry is used in vaulting, and Plateresque facades seem to have presented little problem, to the traditional Georgian of New England modified in the most delightful ways to meet the availability of local materials, the colonial periods seem to have established, in their various locales, architectural traditions which remained acceptable as the bases for development long after the yoke of European government became irksome. In such enormous territories the available materials varied widely, and it is of interest that good quality bricks were available in early seventeenth-century Virginia and fine glazed tiles in early eighteenth-century Mexico.

## China

By the end of the fifteenth century some European powers began to seek eastward colonial expansion. The Portuguese were the first Westerners to come to the coast of Guangdong (Kwangtung) Province. They negotiated a lease of Aomen (Macao) from the local offical of the Ming dynasty in 1561. In Aomen they built fortifications and houses in the Western style—the earliest Western architecture to appear in China. In 1715 the Emperor Kang-xi (K'ang-hsi) of the Qing (Ch'ing) dynasty granted the East India Company the right to trade in Guangzhou (Canton). With the permission of the Qing government a special agency, 'Kohang', was established to take charge of the trade. Meanwhile, the Kohang constructed special buildings; the Thirteen Factories, as they were called, served as the living and trading centre for foreign merchants. After 1757 more Western merchants came to Guangzhou, among them, besides the British, the Dutch, the Americans, the Portuguese and the French. As a result the Thirteen Factories in Guangzhou were renovated and expanded many times.

During the same period Western missionaries also came to China. In 1581 Matteo Ricci, an Italian Jesuit, arrived in Guangdong by way of Aomen, and reached Beijing (Peking) in 1601. European missionaries brought with them the Catholic Christian faith as well as advanced science and technology. Roman Catholicism spread far and wide in China, and many churches appeared in different parts of the country. In the years 1745 to 1759, in the northern part of the Chang Chun Yuan (Garden of Everlasting Spring) of Yuan Ming Yuan (Garden of Perfection and Brightness), the famous imperial garden, a Western-style palace, known as Xi Yang Lou, was designed and built for the Emperor Qian-long (Ch'ien-lung) under the supervision of F. Giuseppe Castiglione, an Italian Jesuit and his colleagues who were serving in the imperial court.

The Opium War in 1840 marked the beginning of the modern history of China. The Western world succeeded at last in opening the door of ancient China with the help of its gunboats. China's two-thousand-year-old feudal society began to disintegrate and gradually became a semi-colonial one. After being defeated in the second Opium War of 1858, in the Sino-French war in 1884 and the Sino-Japanese War in 1894, China was compelled to sign a series of treaties, which reduced her sovereignty. Through the Nanking Treaty, China opened five ports for foreign trade: Guangzhou (Canton), Xiamen (Amoy), Fuzhou (Foochow), Ningpo and Shanghai (p. 1186A). By 1895, the number of open trading ports was increased to over thirty including many of the major cities along the Yangtse River, on the seacoast and even some inland. The territories of Hong Kong and Taiwan were ceded to European powers. The Europeans also seized many settlements and concessions in the cities of Shanghai, Tianjin (Tientsin), Hankou (Hankow) amongst others, and thus reduced these cities to semi-colonial status. In the following years Western-style buildings were constructed in the open ports and leased territories: these were consulates, municipal offices and warehouses, banks, churches, schools, luxurious residences, restaurants, clubs and so on.

In the 1860s a number of bureaucrat-landlords, represented by Li Hongzhang (Li Hung-chang), initiated the so-called 'Westernisation movement' for national defence and established munitions industries and other civil enterprises. After the Sino-Japanese War some forward-looking intellectuals led by Kang You-wei (K'ang Yu-wei) and Liang Qi-chao (Liang Ch'i ch'ao) advocated the reformation of the political system and the encouragement of Western science and technology. Supported by the Emperor Guang-xu (Kuang-hsü), they started a reform movement but were opposed by the Empress Dowager Ci-xi (Tz'u-shi) and her followers. After experiencing the Yihetuan Movement (the Boxer Uprising) and invasion by the Eight Power Allied Force, however, she changed her attitude and acted in favour of reform. The educational system was altered, new schools were set up, advocating perparation for constitutional government. New governmental organs and provincial political consultative bureaux were founded. Most of the buildings constructed during this period imitated Western architectural models.

In the latter half of the nineteenth century and the early twentieth century traditional methods of building, in traditional building materials, were still maintained in most parts of China. In the trading ports and the leased territories Western building technology and more effective ways of using traditional materials were introduced, notably the wider use of load-bearing walls, timber trusses and beam and joist floors. China began to produce cement and steel at the turn of the nineteenth century in small quantities, but for some considerable time these materials were imported.

## Korea

The demand by such countries as England, France, the United States, Russia, and Japan to open Korea for trade in the nineteenth century clashed with Korea's isolationist policies, and new cultural currents caused considerable confusion throughout Korean society. Taking advantage of the situation, Japan forced Korea to sign a commercial treaty in 1876, which is known as the Treaty of Kanghwa, and in 1905 a five-article protectorate treaty known as the Treaty of 1905.

Western-style architecture began to be introduced to Korea around this time. It was introduced in four ways: through foreign diplomatic missions, churches and other facilities built by foreign missionaries, commercial establishments constructed by foreign businesses, and government offices and public buildings built by the Japanese. Most of these structures were of Renaissance and Gothic styling and made of brick and cement.

There was no architectural development to speak of up to the 1910 annexation of Korea by Japan. And the Western-style buildings constructed by the Japanese after the forced opening of Korea to Japan with the 1876 signing of the Treaty of Kanghwa were poorly designed and constructed because of the relative inexperience of the Japanese architects. Moreover, Korea had little spiritual or material resources to divert to architecture as it experienced the Military Mutiny of 1882, the Kapshin *coup d'état* in 1884, the Ch'ondogyo Tonghak Rebellion in 1894, and the Sino-Japanese (1894) and Russo-Japanese (1904–5) wars.

Japan refused to train Koreans in technology after the 1910 annexation, and architecture was no exception. In the initial stages of colonial rule, Japan trained a limited number of Korean technicians in para-technical institutes. In the 1920s a small number of Koreans were given advanced architectural training but it was only after the 1930s that Korean architects were able to design works on their own.

## Japan

The restoration of the Meiji Emperor brought about the political change necessary before Japan could emerge from feudalism and become a modern nation. In 1867, the fifteenth Tokugawa Shogun, renouncing his political power, abolished the feudal government and restored imperial rule. Upon establishment of the new government in 1868, lands formerly possessed by the shogunate were transferred to direct control by the new government. Between 1869 and 1871, the government also took control of the domains of the daimyo, and they were appointed prefectural governors. In this way the feudal system was replaced by the Imperial system under which the whole country was uniformly ruled. In 1873, a conscription system was adopted and the revision of land tax accomplished. Thereafter, no drastic political changes occurred for a time.

One of the factors that made the Meiji Restoration inevitable lay in the growth of commerce and industry, which had brought about the dissolution of the rural communities that had formed the economic bases of feudal government. A more direct factor, however, was the pressure exerted by the capitalist countries which, from the beginning of the nineteenth century, had forcibly sought the opening of the long-closed country. As a consequence of the commercial treaty concluded in 1858, Yokohama, Shimoda, Hakodate and Nagasaki ports were opened the following year to free trade with Russia, France, Britain and the United States. From then on, Japan was propelled toward adopting aspects of European civilisation and constrained to revise domestic policies in order to cope with the national crisis.

Even before the foundation of the new government, a policy to promote industries and build up military forces had been advanced by some feudal lords who perceived the coming crisis. The erection of blast furnaces in the 1850s, the casting of cannons, the construction of iron foundries or shipbuilding yards was undertaken. Such Western industries were developed further under the guidance of foreign engineers: the iron mill of Nagasaki was built by a Dutch engineer in 1861, and the spinning mill of Kagoshima was constructed under the direction of an American engineer in 1863. Settlements which included suitable housing, hotels, trading houses and churches for the exclusive use of foreign residents were constructed in Yokohama, Nagasaki, Hakodate and Kobe.

The new government not only inherited the policies of the feudal clans but also endeavoured anew to promote industries, to strengthen military forces and to construct public facilities nationwide. Although the buildings then required were all taken from the repertory of the traditional wooden architecture, it was necessary to construct them with Western techniques and styles. Thus the introduction of Western

ıre began under the leadership of the Meiji
:nt.

## ınd South-east Asia

Gama rounded the Cape of Good Hope and
tward to land at Calicut on the south-west
ıdia on 20 May 1498. Primarily as Christian
but also with the spice trade in mind, settle-
re established at Colombo in Sri Lanka
ıd Goa on the western coast of India was
Albuquerque in 1510. Other Portuguese
ts were set up at Daman, Diu and Bombay
, the last ceded to Britain in 1661 as part of
/ of Catherine of Braganza; another, at
/as lost to the Marathas in 1739. The Portu-
ıtantially held Sri Lanka until the middle of
:eenth century, when it was taken over by
. There were Portuguese trading posts in
y 1511 and in Martaban, Burma, by 1519.
tch, primarily motivated by the trade in
med the United East India Company (fol-
·lier voyages to the East Indies, as they
·d) in 1602. They had founded Batavia
akarta) and had gained almost complete
Java by the end of the second decade of the
h century and set about extending their
other islands over the next century, even
re had been a British trading settlement on
n tip of Java since 1601.
and in many of the other south-east Asian
ɔf the period, these European incursions
: into Muslim-controlled states, and cer-
Portuguese saw their efforts in the east as
on of their campaigns against Islam at
ective Hindu rule had ended with Malik
nquest of Tamil southern India and his
dura. The Moghul empire burgeoned and
zenith under Akbar in the last quarter of
th century, and it was to his red sandstone
ehpur Sikri that the first English adven-
nas Newberry, came in 1585, carrying a
Queen Elizabeth which was completely
ıe East India Company was founded with
om Elizabeth in 1600, and William Haw-
iled to India had better luck in his dealings
·'s son, Jehangir, who allowed him to set
y at Surat in 1608. Sir Thomas Roe fol-
15, as accredited ambassador from James
r five years and has left a valuable account
ities. It was the ability of the English to
'ortuguese at sea during these years which
root of the decline of Jesuit influence in
:r Jehangir's death in 1627, however,
ver was much reduced and the eighteenth
v the rise of the less unified Marathas
tual downfall at the turn of the century

opened the way to British control in India. Madras was established by 1640 on the south-east coast and Job Charnock had obtained permission to build the town of Calcutta on the Hooghly by 1690.

The French state-controlled Compagnie des Indes Orientales was not founded until 1664; Chandernagore on the Hooghly was established in 1673 and Pondicherry, 160 km (100 miles) south of Madras, in 1684. After Clive's Arcot adventure in 1751 and the capture of Pondicherry in 1761, French influence was negligible in India.

The establishment of orderly British rule stemmed from Lord North's Regulating Act of 1773 which established the governorship (over British India—Calcutta, Madras and Bombay) at Calcutta: the governor was to be assisted by four councillors. Warren Hastings was the first governor under the Act and the powers of the councillors made his task an impossible one. William Pitt changed the system in 1784, and there began in 1786 the line of great governors-general. Lord Wellesley came in 1798 when the East India Company was limited to the island of Bombay and areas of coastal territory around Madras and Calcutta, and by 1805 had expanded its activities into almost the whole of the subcontinent, and alarmed the directors by its cost. Lord Minto, appointed in 1807, out-manoeuvred the French in their last efforts to establish an eastern empire under Napoleon, and captured the Cape of Good Hope from the Dutch (as well as Java which was later returned to them). The Marquess of Hastings, who succeeded him, was responsible for the final eclipse of the Maratha confederacy and the annexation of the Deccan. A fine administrator as well as a soldier, he started extensive irrigation and road works and continued Minto's work in founding schools. In 1819 he gave Sir Stamford Raffles permission to seek a port for British trade south of Malacca, and this resulted in the establishment of Singapore. In spite of fears in London that this might cause conflict with the Dutch, Raffles's enterprise prospered. In 1826 it was joined with Penang and Malacca to form Straits Settlements, which were governed from Singapore from 1832 onwards.

Lord Amherst came next to India (1823), conquered the lower Irrawaddy basin in Burma and placed a British representative at the Burmese court. The remainder of lower Burma was annexed in 1851 in Lord Dalhousie's governorship, following the imposition of restrictions on resident British merchants, and the whole of the seaboard from Chittagong to Singapore was in British hands. Dalhousie was one of the most distinguished of the great governors-general: he began the building of railways and the installation of post and telegraph; an advanced educational system was established; some 3200 km (2000 miles) of road and 29,000 km (18,000 miles) of irrigation canals were built. He died in 1856, a year before the sepoy rising and the siege of Lucknow, and two years before the East India Company was dissolved and the act of parliament was passed which determined that India would be transferred to the Crown. Lord Canning was appointed first Viceroy.

Calcutta's influence waned and British interest was focused upon the industrial and commercial vigour of Bombay. The development of India in terms of her cities, institutions and public services continued throughout the nineteenth century, but confidence in the future was nowhere better displayed than in the unbelievably rapid growth of Bombay in the second half of the century.

Lord Curzon, Viceroy from 1899 to 1905, was a man of enormous energy who wished to establish order by military means and to carry out far-reaching social reforms, but he failed to appreciate the growing spirit of nationalism or the changing social positions in a more liberally governed country. It is his statue which graces the entrance front of the Viceroy's House at New Delhi, completed some twenty-five years after his return to London.

Sri Lanka had been governed by the Dutch since 1658. There had been some contact with Kandy by the British in 1761 but it was an incident in the Anglo-French war which led to the British occupation of Trincomalee in 1795 and the eventual occupation of all the Dutch possessions on the island by 1796. The island became a crown colony in 1798; after a rebellion in Kandy the whole of Sri Lanka was annexed in 1815 and a governor was appointed, more than forty years before the appointment of the first Viceroy in India. The establishment of French rule in Indo-China dates from the same period—a treaty signed by Louis XVI in 1787.

## Australia and New Zealand

### Introduction

Australia is about the same size as the United States, approximately 4000 km (1250 miles) across, an island continent along with Tasmania, which is separated from the mainland by twice the distance that separates Ireland from England. New Zealand lies 1400 km (850 miles) to the east, its two islands 1500 km (930 miles) from north to south. The latitudes of Australia are comparable with those of the northern half of Africa, while those of New Zealand approach the Antarctic more closely, but no closer than the Arctic is approached by Brittany, or by the southern border of Canada. The most immediate neighbours are Papua-New Guinea and Indonesia, beyond which lies Singapore and all of south-east Asia.

White settlement in this part of the world began in the late eighteenth century, and it was entirely British. The offical landing and proclamation of possession occurred in Sydney in 1788, and in the case of New Zealand was delayed (despite earlier whaling and mission settlements) until 1840, at the Bay of Islands.

Navigators from Portugal and Holland had preceded the British but formed no settlements. French explorations occurred in much the same period as the British, but again there were no settlements, except for one brief attempt in New Zealand.

The aborigines of Australia were neither settlers nor builders. Their ancient and fascinating history, now thought to extend back at least 40,000 years, is evidently the history of nomadic hunters, consequently not an architectural topic. Their shelters were always temporary and minimal, just personal shelters of bark or of branches leaning against tree or stake.

The arrival of the Maoris in New Zealand, from somewhere to the north-east, occurred before the fourteenth century. They were more settled than the Australians and more inclined to construction, but produced no more than villages with simple houses and community halls. Old halls have not survived, but modern ones aim to reproduce them. Though admired, their influence on the architecture of the white settlers was negligible. In both countries, therefore, it is reasonable for an abridged account of nineteenth-century architecture to concentrate upon the buildings of European type, created by immigrants, in other words the architecture of the Australasian colonies.

At the other end of the period treated in this Part of the book, the 1890s brought an economic recession which almost halted building for some years. In Melbourne the hiatus was complete between 1893 and 1896. In other parts of the region it was less severe and did not occur at quite the same dates, but it brought about the end of the gold era (see below).

Australian nationhood began in 1901 with federation of the former colonies, and the creation of the Commonwealth Government.

### Physical Characteristics

Fertile and well-watered land is to be found throughout most of New Zealand and along the entire length of the eastern seaboard of Australia, but elsewhere the arable and temperate lands are confined to relatively small coastal areas. The dimensions of these countries are such that the climatic range is very great, from tropical north to cold south, from desert to snowy alps, and (in New Zealand) glaciers and fjords. New Zealand is earthquake-prone, some locations especially so, including the capital, Wellington.

Cities are almost all near the coasts but mining

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ie nineteenth century, prosperity grew
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the subsequent wealth accruing from
rts.

Before the gold rushes there already existed three more colonies in the Australian continent, Western Australia (founded 1826), Victoria (unofficial settlers, 1834) and South Australia (1835). In 1859 Queensland was also created. As with Victoria in the south, Queensland was separated off from the huge territory which had at first been called New South Wales.

South Australia was the scene of the first mineral boom of all—copper was discovered in the 1840s. This was especially attractive to Welsh and Cornish emigrants. Gold rushes in the 1850s depleted the population of South Australia but it revived later as a wheat producer, first in response to the continent's much increased population, then as an exporter using the famous clipper ships.

Western Australia's early foundation was followed by various misfortunes until the 1890s, when gold was found at Kalgoorlie and drew fortune-seekers west from all over Australia and New Zealand. Kalgoorlie is situated in a hot arid location 600 km (370 miles) inland from Perth and its port, Fremantle. Perth has remained the business centre for the mineral and pastoral products in the west.

## Culture

Australia and New Zealand remained primarily outposts of England, Wales, Scotland and Ireland. Some regions were dominated by a particular group such as Cornish miners, Welsh smelters or Scottish engineers. In Australia, the Irish formed a large proportion of the population, having emigrated as refugees from famine, as political exiles, or simply as servants, labourers, shopkeepers and publicans. Other groups were minor but in some locations significant—Chinese gold-diggers (Victoria), Lutheran German farmers (South Australia) and French merchants (Sydney).

Though the amalgam was remarkable and the common language had a unifying influence, in some aspects of life a degree of separation remained. The Roman Catholic church in Australia, almost wholly Irish, grew strong, and was more active and visible than the Church of England, despite the latter's connections with offical and élite activities. The Nonconformist churches were also strong. In mining districts large Methodist churches and Sunday schools were constructed. The Scottish church predominated in some farming areas. The province of Otago, New Zealand, was a settlement venture launched by the Lay Association of the Free Church of Scotland. Elsewhere in New Zealand the Church Missionary Society was effectively a founding agency. With the merchant class, Congregationalists were prominent in Hobart, Melbourne, Sydney and Adelaide.

## Resources

In the early decades (1788–*c.* 1850) all the colonies of Australasia were subject to difficult, pioneering circumstances, and there were few skilled people, few tools and a lack of understanding of local materials. Australia's first professional architect, Francis Greenway, spent a great deal of time supervising the making of bricks and mortar and in instructing bricklayers, before construction of good quality could begin. Convict labour was widely used in New South Wales and Tasmania, but was usually unskilled and uncooperative.

The gold rushes brought many skilled people and created the wealth to make possible the import of whatever and whoever was needed. Once the feverish expectations of easily-won alluvial gold and shallow digging gave way to deep-shaft and mechanical workings, the mining operations themselves attracted engineers and builders. From about 1865 Australian cities were almost as well-equipped with building supplies and workshop facilities as any advanced country of the time, though at least six months of waiting time was involved in ordering and receiving items from 'home'.

However, the pioneering circumstances prevailed long after 1850 in the remote places untouched by the gold rush or by urban growth, and longest of all in those places out of reach of coastal shipping or the railways. The very first railway lines were under construction before the discovery of gold, and the growth of major routes continued from the late 1850s.

## Building Materials and Techniques

In such extensive countries the range of building materials is wide. Some areas have dense forests of very tall trees, others have no usable wood at all. The most widespread species of timber in Australia is the eucalyptus, whose many varieties are all hardwoods, some very dense; colours vary from yellow to deep red. Early settlers found the hardness and the need for long seasoning to be serious deterrents to its use and preferred other native species such as the toon tree, which is like a soft red cedar. As a result it is now almost extinct. Timber was also imported from New Zealand, the Baltic and California.

Australian building stones define the regions distinctively—the blue-black volcanic basalt of southern Victoria, the golden sandstone of the Sydney region, or the soft grey limestones and brown-black schists of South Australia. There are also places yielding excellent granites and marbles. Clays have been available for the production of bricks almost anywhere, by farmers or by professional manufacturers, though they have varied greatly in colour and durability.

As soon as galvanised iron arrived (1850s) it was widely used. Decorative cast iron was adopted enthusiastically; at first it was imported but was soon made throughout the country, especially where the workshops set up for mining purposes were equipped with suitable foundries.

During the period 1870–90, particularly in New South Wales and Victoria, decorative iron was popular but was displaced later by turned and fretted woodwork.

Many of the celebrated buildings of New Zealand are in timber. There was a plentiful supply of the renowned Kauri pine which was also exported to Australia in the early decades, being much easier to work than the eucalyptus hardwoods. Bricks were made and stone was available, though it was not until 1865 that the value of Oamaru limestone for fine work was recognised. Earthquakes favoured the use of timber. There are many examples of wood buildings made to look like stone, the best-known being the extensive four-storey Government Offices at Lambton Quay, Wellington, by W. H. Clayton, Colonial Architect, 1874. Earthquakes have destroyed many of the country's best nineteenth-century examples: most of those in the town of Napier were demolished by the 1931 earthquake.

# Chapter 33

# AFRICA

## The Coastal Forts

In 1481, ten years after the Portuguese first landed on the west coast of Africa, John II ordered an expedition to build a fortress at Elmina. It was given the name of São Jorge da Mina. Although constructed of stone, little of this structure, which was built in 1482, is visible in the present building. It had two storeys and was built around a courtyard, had corner towers, alternately round and square on plan, and a Great Court extending towards the sea. In its first form, it lasted for about a century but Renaissance fortifications, developed in Italy during the sixteenth century, were quickly adopted by other European princes and their engineers. Portugal was no exception, and the forts constructed on the African coast reflected the Italian treatises by such experienced engineers as Girolamo Cataneo (1564) and Galasso Alghisi (1570). The African forts were modified to take account of the materials available and were less sophisticated than their European models.

**São Jorge, or Elmina Castle** (pp.1186B, 1187A), was largely reconstructed in the late sixteenth century, possibly on the advice of an Italian engineer, Filippo Terzi (1520–97), who was engaged to modernise Portuguese fortifications at home and abroad. The walls of the main block were thickened, the outer walls of the Great Court were strengthened, and additional triangular bastions were built. The fort provided a pattern for others that were built subsequently. The most important of these were the British **Cape Coast Castle** (*c.* 1674) (p.1186A), and the Danish **Christiansborg** (1661–70), largely remodelled over the years and now the official residence of the Ghanaian Head of State. By the end of the eighteenth century over thirty forts, castles and trading lodges had been built along the Gold Coast by nine European nations or their chartered companies.

**Fort Jesus** (p.1187D) on the East African coast was designed by an Italian engineer, Joao Batista Cairato, who is described as 'Chief Architect of India' in an inscription above the main gate. Gaspar Rodriguez was in charge of the work, which was completed in 1593. In plan, it consists of a large rectangular courtyard surrounded by coral-stone curtain walls, four corner-bastions and a rectangular projection, with small angle-towers on the seaward side. Like Elmina Castle it incorporates a church in the courtyard. The Dutch had taken over the main European trade by the early seventeenth century, and they continued to construct **forts** along the West African Coast. At Elmina, for example, in 1662–6 they built one on **S. Jago** Hill to protect the former Portuguese castle which had passed into their hands in 1637 (pp.1186C, 1187E). This was **Coenraadsburg**, and the almost square plan with four triangular corner-bastions also seems to have provided a model for later structures, for example the Brandenburg-Prussian **Gross Friedrichsburg, Princestown** (1683), the English forts at **Commenda** (1686), **Dixcove** (1692, enlarged *c.* 1750, when a large spur was constructed on the west side) (p.1187C) and **Anomabu** (1753), and the Danish **Fort Prinsensten, Keta** (1784). Close to Christiansborg Castle a variant, a **fortified house**, was built (*c.* 1829) by Johan Emmanuel Richter (p.1187B); this consisted of a residence placed between two courtyards surrounded by storerooms, and the whole group, contained within defensive walls and bastions, was entered through a single pedimented gateway.

Rudimentary pediments over windows and doors, sometimes filled with armorial shields, are generally the only decorative embellishments found on these severely practical buildings, although the inner face of the 1750 addition to the Dixcove Fort was unusually ambitious, with its blank arcading and coupled pilasters. The Dutch, who retained possession of their forts on the Gold Coast until 1872 when they sold them to the British, had made many alterations to the Portuguese buildings which they had taken over. It is to them that most of the Classical embellishments, such as the Doric colonnade and the segmental pedimented gateway at Elmina Castle, must be attributed. A portrait of Dirck Wilne, Director General of the North and South Coast of Africa, painted in the 1660s, indicates the quality of the gilt leather wall covering, oriental carpets and portable furnishings that were brought out from Holland to provide comfort in the Governor's apartments.

The year after de Witt had recorded Wilne surrounded by the trappings of European civilisation, the foundation stone of a new castle was being laid more than three thousand miles to the south. The Dutch East India Company was established in 1602 when the separate Companies in Amsterdam, Rotterdam, Delft, Middelburg, Hoorn and Enkhuizen united. In 1650 the new Company decided to set up a station at the Cape of Good Hope where one of its ships had been driven ashore in Table Bay three years earlier. In 1652 the first Dutch ships arrived there, and an earth-built fortification with timber buildings was quickly erected. Once the station had been established, more permanent structures were needed, and a site was chosen for a **Castle**, pentagonal in plan, with a bastion named after one of the several titles of the Prince of Orange at each of the five corners (p.1187F). Work began in 1666. This was the time when the Dutch school of military engineering had risen to a position of some importance, and the system of fortification perfected by Simon Stevin (1548–1620) was adopted by the engineer Pieter Dombaer who was responsible for the Castle. Built of stone, it was completed in 1679; three years later a gateway was added, modelled on that of Dordrecht and displaying the arms of the six founding Dutch towns.

So far there had been similarities in the setting up of trading posts in East, West and South Africa, but it was only on the Cape that a colony was quickly established. After 1657, burgher families were established behind Table Mountain to cultivate the land. Two years later it was reported that wine was pressed for the first time from the Cape grapes and that the first flowers had bloomed on the imported rose trees. From then onwards developments around the African trading forts began to take different directions.

## North, West and East Africa

Portuguese expeditions to North Africa resulted in the acquisition of a number of coastal towns, including Tangier, Morocco, which was captured in 1471. Almost 200 years later it became a British possession as part of the dowry of Charles II's queen, Catherine of Braganza, and its acquisition almost led to the appointment of Christopher Wren as designer and supervisor of **Tangier's new fortifications**, but he refused the commission. Wenceslaus Hollar recorded these fortifications in 1667, but they were all destroyed when the city was abandoned in 1683. Ottoman incursions effectively ended European hopes of conquest along the North African coast until the French arrived at the end of the eighteenth century.

The Napoleonic campaigns in Egypt in 1789–99, and the publication in 1802 of Baron Dominique Vivant Denon's *Voyage dans la Basse et la Haute Egypte*, and subsequently his *Description de l'Egypte*, resulted from 1809 onwards in a European-African stylistic influence that was, for once, in reverse. Detailed archaeological surveys were beginning to offer opportunities to European designers to adopt details and forms from ancient Egyptian buildings. And although there was little time for the French themselves to undertake any building in Egypt before they departed in 1801, French scholars were to maintain a close association with Egypt. French influence was strong on Muhammid Ali, the founder of modern Egypt and the rebuilder of Alexandria. He built himself a **palace at Shubra** and laid out the long boulevard linking it with Cairo and another connecting the capital with Boulak. In 1845 work began on the construction of the rue Neuve, which cuts through the old street pattern of Cairo, and Muhammid Ali's successor, Isma'il Pasha, continued in the 1870s with the formation of the place Atabah al-Khadra and the streets radiating from it. It is said that around 400 buildings were removed in order to make way for the boulevard Muhammid Ali alone.

There was extensive construction of new buildings in **Cairo**, mostly in an Italian or Austrian classical style; but there was also a revival of interest in Arabic decoration which was used in the designs of private houses, for example, **Villa Delort** and **Villa S. Maurice** (1874) and **Villa Zogheb** (1898) and apartment buildings. The salamlik of the **Guezireh Palace** (Frantz and De Carel, 1863) is richly ornamented with Arabic details, although it was constructed of cast iron in Germany. Other examples include an elaborate public fountain at the **Babel Hadid** (C. Pantanelli, *c.* 1870), the **Khayry Bey Palace** (1870), the **Museum of Arab Art** (A. Manescalco, 1903), **Kasr el Nil Palace** (Pantanelli) and **Omar Sultan's Palace** (A. Laseiac, 1907).

The imposition of a formal pattern of open spaces and straight avenues is characteristic of French colonial development policies. In 1830 they occupied Algeria, and one of their early decrees concerned the creation of a Place du Gouvernement and the widening of a number of streets in the old city of **Algiers**. Over the next thirty years some of these ideas, which resulted in straight roads with uniform arcaded facades, were executed on the principles practised by Haussmann and others in Paris, and for similar reasons of sanitary improvement and military control. Chassériau was responsible for the long uniformity of the **Front de Mer** and for the **Opera** (1850).

There was little European building in East and West Africa during the first half of the nineteenth century, and little architectural influence, although the forts that had been built on the coasts seem to have provided models for some of the African rulers. The **fort in Lamu**, for example, was built in 1813–21 by the liwali or governor, reputedly with the co-operation of the Sultan of Oman; its crenellated parapets, central courtyard and sturdy corner tower probably derive from European forts. So, too, did the **Stone Palace** or Aban (p.1191A) built in 1822 by Osei Bonsu, the Asantehene, as a part of his capital Kumasi. Stone was sent up from the Elmina coast, and the ruler ordered that within this semi-fortified residence designed around a courtyard, the casing of the windows should be in gold and the doorposts and pillars were to be of ivory. The intention seems to have been both innovative and an attempt to impress European missions which were received there. At the end of the century, when the **Sultan of Zanzibar** built a new **palace**, there was little difference between its architectural character and that of the European coastal forts, although steel was used in its construction.

On the whole, traditional forms and methods of building were untouched by influences from European countries during the eighteenth and early nineteenth centuries, although the trading towns on the east coast had long been receptive to influences from Arabian and Indian ports. The Swahili **coral-stone houses** in Lamu and Zanzibar, for example, had been built as inward-looking designs around a courtyard from the fourteenth century onwards (p.1190E). During the eighteenth century the most important of them had been richly decorated with carved plasterwork on the walls of the principal rooms and carved woodwork on the doorways. The details of this decoration suggest Iranian or Indian influence, and probably the elaborate projecting balconies in the streets of the old east-coast towns (Lamu, Zanzibar, Mogadishu, Mombasa) were also part of an imported culture from across the Indian Ocean; so too is the moulded decoration found on some nineteenth-century buildings in Mombasa which might be described as Indian-Baroque.

Portuguese and Spanish mission churches were built along the Gambia and Zaire rivers in West Africa in the sixteenth century, but of these virtually nothing remains. The first **mission station** on the East African mainland was set up in the bush north of **Bagamoyo**, Tanzania, by the French Holy Ghost Mission. Almost immediately after its establishment in 1868 a **church** was built. It was a simple coral structure with a tower crowned with corner pinnacles, and was later superseded by a more elaborate church in the French Romanesque style (1910–14) (p.1191C). The smaller mission churches, of which relatively few survive, were usually rectangular vernacular structures, although such details as pointed or round-headed windows were often introduced as token symbols of the buildings' purpose. The remains of a stone-built church at **Niamkolo**, Zambia (1895–6), on the shore of Lake Tanganyika, illustrate the type of building, sometimes with a tower (in this case 15 metres high), put up by the London Missionary Society under the supervision of a teacher. **Emmanuel Church at Freretown**, Kenya, was built by descendants of slaves in 1884, and this ambitious design incorporates an arcade of round-headed arches and triple lancets.

The Romanesque was a favoured style once a mission had been established and more money was available for building, as at Bagamoyo (q.v.). Presumably the characteristic heavy masonry and small windows were thought more suitable than the Gothic style to the climate and the local materials. In **Kampala**, Uganda, the White Fathers built **Rubaga Cathedral** (1912–25) with tall, twin western towers and Romanesque details, and they used a similar style for the **Cathedral at Ouagudougou**, Upper Volta, while **S. Joseph's, Zanzibar** (1896–8, M. Berangier) (p.1191D), was modelled on the basilica of Notre-Dame de la Garde at Marseille, France. The **Roman Catholic Cathedral at Mombasa**, Kenya, is a similar but less accurate version of a Romanesque basilica. First built at the end of the nineteenth century, it was rebuilt to a design by Brother Gustave Walter in 1918. The **Anglican Cathedrals at Zanzibar** (1873–9, C. F. Hayward) and **Mombasa** (1901–5, J. H. Sinclair) combine Early English and Islamic detailing; the former has a campanile, and the latter (completed in 1905) a crossing dome and twin-domed western towers.

Many of these buildings are impressive achievements, although few were built to designs by architects. A Mr Scott, 'who had never had a single lesson even in bricklaying, much less in architecture', was responsible for the design and execution of the large brick-built **Church of Scotland Mission Church at Blantyre**, Malawi (p.1191B), which was completed in 1895 with twin west towers and a domed crossing. However, in some cases the assistance of British architects was sought. Sir Aston Webb provided the design for **Holy Trinity Church, Accra**, Ghana (1893), and Robert Weir Schulz the low Romanesque design for **All Saints Cathedral, Khartoum**, Sudan (1909–12), in which small high-level windows only were used in an attempt to offset the effects of the African heat. Similarly, when Beresford Pite designed the **Anglican Cathedral**, the fourth on the site, **at Namirembe, Kampala**, Uganda (1913–19) he used a modified Arts and Crafts Gothic style in which small windows are set within large recessed pointed arcading. His distinctive plan for this building included triple transepts, a domed crossing and a tall western tower which was not built. Temple Moore's design for **All Saints Cathedral, Nairobi**, Kenya (1915) was not completed according to his intention. Much later, in 1938, Adrian Gilbert Scott's **All Saints Cathedral, Cairo**, Egypt was described as 'a free rendering of Ecclesiastic Classic adapted to the Egyptian climate'.

## Chapter 37

# SOUTH AND SOUTH-EAST ASIA

## South Asia: Architectural Character

### Portuguese Colonial Architecture

The Portuguese had two main objectives when they arrived in the east in the late fifteenth and early sixteenth centuries: the first was to break into trade, which at that time was the monopoly of the Arabs; the second was to convert the eastern peoples to Christianity. To these ends they established fortified settlements at strategic points along the sea routes. As Roman Catholics, the Portuguese built many churches and monasteries dedicated to saints, and even the military bastions of the forts were named after them. Many shrines and churches were built at road junctions and in the interior and were usually marked by large, conspicuous crosses. The churches, many of which were built in the sixteenth and seventeenth centuries, followed European styles, but technological and economic constraints often limited their expression to the facade only. The churches themselves were barn-like in character and constructed in indigenous materials using local techniques.

There were attempts in early churches to reproduce Gothic details, but it was not long before the effects of the Renaissance in Europe led to the development of a characteristic Portuguese Baroque style. In the colonial settlements buildings became larger in scale, their facades often heavily ornamented with oriental as well as European motifs. Religious houses such as the Franciscans, Dominicans and Capuchins stamped their own preferences upon the buildings they commissioned. As Portuguese power faded in the east, however, the architecture was debased by stylistic imitation and over-decoration.

### Dutch Colonial Architecture

The Dutch sailed eastward mainly for purposes of trade, arriving in India and Sri Lanka about a century after the Portuguese. Their fortifications consisted of rampart walls encircling the settlements, which were divided into two areas, one for Europeans and the other for the indigenous population. The towns were planned with streets, drainage systems and trees, and because of the need for large numbers of dwellings within the fortified settlements, regulations were imposed upon the architectural development of streets. Some of the results can still be seen today in the form of well laid-out localities, shaded paths and vistas. The bastions of fortified towns were named after Dutch cities; in contrast to the Portuguese, each town had a simple church, sometimes with a few local motifs applied to their facades, but usually devoid of ornamentation.

The Dutch placed their warehouses for export goods in prominent positions adjacent to the harbours. Brick vaulting was the most characteristic method of construction and was also used for churches.

A 1294

### British Colonial Architecture

The British influence on the Indian subcontinent dated from the setting up of the East India Company (see Chapter 32). Unlike the Dutch and Portuguese, British settlers moved out of the enclosed townships, so that the scope of the economy was widened beyond basic trade to the production of capital crops and semi-processed goods suitable for the European market. This called for the provision of a comprehensive network of communications including roads and railways, as well as the establishment of provincial cities throughout the country.

The need to erect structures quickly encouraged the development of new constructional techniques: these included sophisticated prefabricated systems using cast-iron, steel and metal sheets which could be manufacturered by the new industries at home. Standard plans for common types were evolved: these were more suited to industrially manufactured components, which were used for plantation buildings and other accommodation such as that related to the new communication systems. But government and commerce alike favoured the adaptation of the prevalent European styles—in particular those of the later Renaissance in Britain, Palladian, neo-Classical and Baroque, and in the nineteenth century the revival styles including Gothic. Design was influenced by the tropical climate, helping to produce local hybridised styles, as did the use of oriental motifs, sometimes giving a unique flavour to individual buildings.

1054 A [illegible] Cml

Expansive civic design undertakings were implemented. Residential developments, museums, hospitals, churches, sports clubs, schools, commercial buildings including banks, administrative buildings, town halls, department stores, and communications centres with stations and post offices, were the hallmarks of British colonial development in the nineteenth century. Military buildings to house the garrisons were usually confined to cantonments on the margins of cities and townships.

## Other European Colonial Settlements

Other European countries also set up trading settlements and developed colonial leanings in India and Sri Lanka, notably France and, on a smaller scale, Denmark.

## South Asia: Examples

### Portuguese Architecture

1994

### *Forts*

The wealthy island port of **Goa**, originally taken by Alfonso de Albuquerque from the sultan of Bijapur in 1510, was protected from land attack by three fortifications. **Fort Aguada** (p.1258A), on the coast of Pernem, stood on a cliff overlooking the sea, its bastions placed at strategic points related to the contours. A church and a tower provided the focus of the fort. The island **Fortalice of Cailo** and **Fort Largo** protected the mouth of the river Zuari, and the south bank of the river was protected by **Marmagoa** (p.1258B), a fortification with prominent bastions facing the sea and with an arched entrance gate.

A fortification at the mouth of the river Mandovi protected the first capital of Portuguese India, Velha Goa—in the seventeenth century one of the most opulent cities in the world. It was laid out with a church facing onto a square, with mansions and villas arranged around minor piazzas, their windows opening onto balconies with wrought iron railings. The square fort, isolated from the main island by a canal, was entered through an arched gateway facing the waterfront. Though most of the buildings have disappeared, something of the city's splendour and romance lingers on amongst the ruins of Velha Goa.

**Panjim**, which succeeded Velha Goa as capital in the nineteenth century, was a linear town with a grid plan laid out along the sea front with high ground behind it. Other fortified towns established by the Portuguese along the west coast of India in the second half of the sixteenth century were **Diu, Bassein, Daman, Bombay**, and a little further north still, on the Gulf of Cambay, **Surat**, where the British, Dutch and French also built factories or trading lodges in the seventeenth century (p.1258E). Similar settlements were established on the east coast on the river **Hooghly** and at **San Thome**. The posts were strongly walled enclosures containing the domestic as well as the mercantile accommodation; the degree of fortification seems to have varied with location.

On the island of Sri Lanka, the Portuguese **Fort of Colombo** was established in 1518 on lines similar to Velha Goa, with an inner fortification for administrative and military purposes, and an outer residential area. The enclosure, still known as the Fort (p. 1258D), was originally laid out by one João Baptista, an engineer commissioned to design the fortifications which consisted of fourteen bastions. There were about five hundred residential buildings with gardens in the outer part of the city. Similar **fortifications** controlled the entrance to Jaffna at **Kayts, Karaitivu** and the **Island of Hammenhiel**, and the entrance to Trincomalee harbour at **Ostenburgh** and **Sober Island**. Others, such as **Menikkadawara**, built by General Don Jeronimo d'Avesedo, were sited and constructed against attack from the interior.

### *Churches*

At first, most of the durable buildings in the Portuguese settlements were religious in character. The missionaries saw it as their duty to convert the indigenous population to Roman Catholicism, and as soon as finance became available churches were built to simulate as nearly as possible European prototypes. This aim was often only achieved in the facades of the buildings—the accommodation for the worshippers being constructed in cheap and easily available local materials and techniques. Other early churches were little more than fortified enclosures with bastions surrounding a centrally located shrine and priests' quarters, as in the first church at **Aguada, Goa**, and at **Ratnapura**, Sri Lanka. The first Christian shrine in India was dedicated to **S. Catherine** a year after the occupation of Goa by Albuquerque. Originally constructed in mud, straw and palm leaves, it was extensively modified and rededicated in 1513, and in 1539 was inaugurated as the cathedral of the newly established diocese of Goa.

The **Church of Our Lady of the Rosary, Goa**, built in 1543, is the best surviving specimen of the early period of Portuguese church architecture. It is a hall church with nave, transept and apse. The cylindrical towers are surmounted by domes, and a two-storey box-like structure with arched portals serves as a porch with belfry above. There are Hindu and Muslim motifs in the decoration of external wall surfaces.

The **Church of S. Francis of Assisi, Goa**, begun in the pioneering early sixteenth century (1527), was rebuilt in the seventeenth century but retains its earlier facade with twin octagonal towers. The interior (p.1258C) is vaulted and embellished with complex arrangements of coffer-like decorated square panels. The majestic simplicity of the high groin vaults is interrupted by Baroque details which include sculptured figures. Frescoed panels on the broad flat piers supporting the main vault are painted in a hybrid style using intricately combined Indian and European elements.

**Se Cáthedral, Goa** (begun 1562, completed 1662), was by architects Ambrosio Argeiro and Julio Simayo. It combines a nave and double aisle with single-volume planning. It is rectangular in plan with an apse. The main facade with its paired flat pilasters and scroll brackets is reminiscent of Vignola's Gesù church in Rome (built about the same time). Julio Simayo also designed the **Arch of the Viceroy** and the **College of S. Paul, Goa.**

The **Basilica of Bom Jesus** (1593–1603) (p.1260C) is the most celebrated church in **Goa**. It is cruciform in plan and has a single nave volume. The 'triumphal arch' facade has a centre bay which rises an additional storey to form a pedimented gable with ogee parapets with shell decorations either side. The Classical impression conveyed by the ground-floor facade relates comfortably to the echoes of Plateresque decoration and the Baroque forms of the upper levels. Internally there are galleries on both sides of the nave, which is vaulted. There is a gilt single-storey retable dedicated to S. Ignatius, and the southern wing of the transept houses the **Mausoleum of S. Francis Xavier**, the apostle of the Indies.

Another fine example is the **Church of S. Catejan, Goa** (1661), whose main facade seems to be a modest imitation of S. Peter's in Rome. Although the church seems to be rectangular externally, it is a Greek-cross plan, has an aisled nave ending in an apse, and four massive piers at the crossing, which is surmounted by a cupola and a lantern. The **Church of the Immaculate Conception, Panjim, Goa**, stands on a high podium approached at the west end by tiered double flights of steps, an arrangement which appeared in many Portuguese and Spanish churches of the seventeenth and eighteenth centuries and even as late as the early nineteenth century in the Americas, for example at Congonhas do Campo, Brazil (q.v.).

In **Sri Lanka** the **Church of S. Paul, Colombo**, was referred to by Antonio Rubino in 1622 as a church built in the Corinthian style, well proportioned and handsome'. The church no longer exists but a map of 1658 shows it as the most prominent of the nine Portuguese churches in seventeenth-century Colombo.

## Dutch Architecture

The interest of the Dutch United East India Company was to lie mainly with Java and the spice islands. Sri Lanka, however, provided a useful staging post as well as a new trading base and finally came under Dutch control in 1658; it remained so until the end of the eighteenth century.

### *Forts*

The Dutch enlarged the forts built by the Portuguese around the coasts of Sri Lanka, and where necessary established new ones. A number of comparable forts are illustrated in Chapter 33 (pp.1184–8). There are few examples in India, though in some cases the Dutch, British and Portuguese all had warehouses within the same enclosures (for example Surat, q.v.). The Dutch work on forts in Sri Lanka all dates from the second half of the seventeenth century. Stockaded compounds included **Tirukovil**, **Samanthurai** and **Kalmunai**, which were listed by Valentyn, a Dutch writer of the seventeenth century. Most of the fortified settlements were on the seaboard, but there were a few smaller square stockades on internal frontiers such as those at **Akuressa** and **Hakmana**, both moated, their garrisons housed outside the main enclosures. **Hammenhiel** and **Point Pedro** were single-bastion forts, the former with a masonry bell-tower above the entrance gate and two three-storey warehouses at the centre of the fortified enclosure.

**Batticaloa**, where the Dutch fleet first landed on Sri Lanka in 1602, **Kalpitya (1667)** and **Mannar** (1686) all had multi-bastion forts with churches, and the **Fort of Jaffna** had an arched gateway with a drawbridge over the moat; the enclosure was 1.6 ha (4 acres) in area and contained the commander's residence, now referred to as the King's House. The Dutch extended and consolidated the fortified townships at **Colombo** (p.1260A), **Galle** (p.1260B), **Trincomalee** and **Matara**. Colombo became a complete miltary town, with a hospital, schools, stores and workshops as well as various grades of residential accommodation. Galle, which by 1729 had fourteen bastions, is the best-preserved fortified township in south-east Asia (p.1260E). The Portuguese bastions on the land side were enlarged and improved by the Dutch. The fortifications enclose about 40 ha (100 acres). There was a water gate, and access from the mainland was by means of a drawbridge through an arched entrance dating from 1669. The Dutch church with its Baroque facade was the first Protestant church in Sri Lanka. Galle boasted a sophisticated and unique drainage system, flushed with sea water pumped by a windmill.

### *Churches*

During the Dutch period in Sri Lanka two types of church were erected: the rural churches which combined school and meeting house, and the more formal urban churches which reflected European styles. In the former some continuity with the Portuguese period can be discerned. Simple rectangular meeting halls were roofed in local materials supported on masonry piers with half-height walls between them. There are churches of this kind at **Mannar**, **Kalpitya** and **Ambalagonda**.

The Dutch **church at Jaffna** (dedicated 1754) (p.1260D), was built by Martinus Leusekam on a Greek-cross plan. The arches over the doorway and windows were built with imported Dutch bricks and the walls with coral stone and rubble. The recessed square panel above the entrance doorway forms the centrepiece of the entrance facade and is surmounted by a characteristic gable with a curved outline. The windows are deeply recessed internally, with deep mullions. There were notable Dutch **churches at Galle** and **Wolfendahl, Colombo**, the former completed in 1755, the latter in 1757.

### *Secular Buildings*

United East India Company **warehouses at Galle** were constructed as part of the main rampart walls; they were two-storey masonry buildings with massive timber-framed floors and roofs. Later buildings, such as the **warehouses at Colombo** around the old harbour, are characteristically brick-vaulted, of great length and about 9 m (30 ft) span, usually with iron tie-rods at springing level. Vaults were either single barrels or twin parallel vaults with masonry piers spanned by great arches between them. They were plastered internally and lit from circular lunettes in the crown of the vault, with lanterns covering these openings on the outside.

The typical planning grids of colonial Dutch fortress towns in Sri Lanka resulted in regular avenues with subsidiary roads crossing them at right angles. Long rows of single-storey houses had verandahs supported by rounded brick or timber columns facing onto tree-lined streets. Sometimes a timber railing fixed between the columns accentuated the urban perspectives. Entrance doors, placed centrally in the facade, gave access to the houses and to the courtyards at the rear. Louvred timber screens were placed in front of the main entrance doors to permit natural ventilation without visual intrusion, and there was a variety of carved timber fanlight grilles and ornamented lintels over openings, giving each house an air of individuality (p.1262A). Verandahs provided shade and facilitated through ventilation to ameliorate the harsh tropical climate. Ornamental gables were turned at right angles to the line of the street in some colonial towns, of which Jaffna is one, and served as elaborate party-walls. The **Abeygunawardene Walauwa, Galle**, is a typical example of the period; it is entered through a verandah which separates the house from the street.

## British Architecture

1994 A
India

### *Forts and Trading Posts*

The British East India Company established its first **factory at Surat** in 1613 (see p.1258E). Many more trading stations were initiated in the next fifty years or so, some of which very quickly began to develop into settlements both within and without the fortified enclosures.

**Fort S. George, Madras** (originally founded in 1639) (p.1262B), grew spectacularly throughout the seventeenth century and a second urban area was developed outside the original fortifications. On the south-east Coromandel coast of India it was to provide a stepping stone to the north-east. The fort was built with star-shaped bastions to north, south and west and was of the order of 1450 m (4250 ft) in length from north to south. The walls were comparatively low and had parapets with open embrasures. Entrance to the fort was through a water gate set into the east wall. Government offices, the arsenal and the church (S. Mary's) were within the walls.

Trade had soon moved north and east and **Fort William, Calcutta**, was built in 1696 in one of the locations—on the river Hooghly, the most westerly of the rivers of the Ganges delta—already used as a centre for the Bengal trade. It was smaller than Fort S. George but nevertheless housed within it the Governor's residence, houses for military and civilian settlers, warehouses and factories. Other public buildings, including the church, were outside the walls.

### *Churches*

1994 A

**S. Mary's Church, Fort S. George, Madras** (church completed 1680, tower late eighteenth century), is one of the earliest British buildings still existing in India and was the first Anglican Church on the subcontinent. It is a simple aisled church with a gallery at one end protected from view by a carved timber screen. Heavy stone walls and roof are characteristic of the defensible location.

**S. George's Cathedral, Madras** (1816) (p.1263A), was designed and executed by Captain James Caldwell (later Sir James) (1770–1863) and Thomas Fiott de Havilland (1775–1866). Like so many colonial churches of the period, S. George's owes its style to James Gibbs's *A Book of Architecture* (1728) which had wide circulation overseas, and to designs for S. Martin-in-the-Fields, London, completed in 1726, one of the buildings included in the book. S. George's continues the incipient Palladianism of the Gibbs building, though implied Baroque movement remains in the pedimented and balustraded portico at the west end with its coupled Ionic columns, and their simpler reflections in the shallower porticoes of the north and south sides. The order is repeated around the drum of the tower above the Tuscan Doric of the rusticated second storey and also in the interior colonnades of the church. The whole building gives the monolithic impression conveyed by smoothly finished chunam rendering—at S. George's carefully detailed and competently executed.

Thomas de Havilland and Caldwell were responsible also for **S. Andrew's Presbyterian Church, Madras** (1821) (p.1262C), developed from another of Gibbs's published designs for S. Martin's, this time with a circular plan form. The result is a sophisticated and original design in the currently acceptable neo-Classical mode. The circular space is 24.5 m (82 ft) in diameter, defined by a ring of splendid Composite columns below a saucer dome. The aisles surround the central cylindrical volume outside the colonnade. The tower rises from the rectangular compartment linking the nave with the west portico, which like S. George's has coupled Ionic columns at its angles.

Two important neo-Classical churches, one late eighteenth, the other early nineteenth century, were built in Calcutta before the appearance of the Gothic Revival and the ebullience of High Victorian Gothic. **S. John's Church, Calcutta** (1787) (p.1263C), built by James Agg (*c.* 1758–1828) after the major extensions to Fort William (completed 1773), was another church inspired by Gibbs's S. Martin-in-the-Fields. The tower was originally at the rear of the building, but the entrance was moved to a position below it towards the end of the eighteenth century. Additional shade from the sun was provided by adding colonnades on the north and south sides of the church in the nineteenth century. The **Presbyterian Church of S. Andrew, Calcutta** (1815) (p.1263D), owed much to S. John's—notably its Tuscan Doric order—and returned more nearly to the London prototype. Its style and proportion were appropriate to its setting, adjacent to the Writers' Building (q.v.).

**S. James's Church, Delhi** (completed 1836) (p.1263B), is a lavish and unusual example of the neo-Classical churches in India. Its founder and patron was Colonel James Skinner (of Skinner's Horse). The plan is a Greek cross with a dome rising from an octagonal drum with circular windows below an entablature. There are Doric porticoes with coupled columns to the north, south and west arms of the plan, with a squat tower between two of them. The crowning features of the ribbed dome are carried on scroll brackets giving it a Baroque character, strengthened by the superimposed balustrades above the entablature and the elliptical recesses below it. The architectural effect of this seemingly small, actually spacious, church is wholly satisfying.

As well as the many neo-Classical smaller churches in cantonments and on hill stations, there were also distinguished examples in the settlements of other European countries (see p.1274). Towards the middle of the nineteenth century picturesque Gothic began to appear, albeit slowly, because it was thought unsuited to the climate. It was to retain its romantic grip for a decade or two until the appearance of buildings which demonstrated a more rigorous understanding of the principles underlying the mediaeval styles. It was maintained, for example, in **S. Peter's Church, Fort William, Calcutta** (1835): this was a Collegiate Gothic building with octagonal corner towers. But the picturesque Gothic style is best exemplified in India by **S. Paul's Cathedral, Calcutta** (completed 1847) (p.1263E), by William Nairn Forbes (1796–1855), a military engineer. It is an impressive brick building, rendered in chunam, with a metal-framed roof. After earthquake damage the tower was rebuilt in the 1930s to a design based on the central tower of Canterbury cathedral. S. Paul's contains a stained-glass west window by Burne-Jones.

It is perhaps appropriate that the more vigorous attitude to Gothic began in Bombay just before the centre of British activity in India began to move from the eastern to the western seaboard following the trauma of Cawnpore and Lucknow, and at the beginning of the imperial period. The mid-century years also marked an increase in serious consideration of the styles which might be suitable, or at least reasonably adaptable, to the climate. Henry Conybeare's **Church of S. John the Evangelist, Bombay** (1858), begun about the time S. Paul's, Calcutta, was completed, is an example. It has a high nave, a belfry and a tall broach spire. Windows are placed so as to assist cross-ventilation.

European expatriates erected impressive monuments to those of their number who died in service. Some early examples reflect local building traditions in their (Islamic and Hindu) forms. The cemeteries (p.1263F) of the cities, hill stations and cantonments contain many fine examples of tombs in the changing architectural styles of the later eighteenth and early nineteenth centuries.

Although not built primarily as a mausoleum, it is perhaps appropriate at this point to include Claude Martin's **Constantia, Lucknow** (p.1264A), sometimes referred to as a palace-tomb, still incomplete on his death in 1800. The building (now a boys' school, La Martinière) was conceived, probably by the enigmatic Martin himself, as a country house overlooking a lake. The two-storey building, which was approached by an impressive array of steps from the lakeside, has a squat four-storey central block surmounted by an open dome. The house has rooms at lower levels without natural light: one of these was the sepulchre which was to be occupied prematurely, before Martin could long enjoy his architecturally hybrid palace-folly with its guardian lions, mixed Composite orders and moghul pavilions. The house itself was not completed until later and the outward-curving wings were added in 1840.

## *Secular Buildings*

Although Surat had been established over twenty years earlier, Madras (Fort S. George, q.v.) was the first centre to develop as a settlement and had pretensions to civic pride early in the eighteenth century. This development was somewhat retarded by the French capture and occupation for a few years in mid-century. The **Grand Arsenal, Madras** (1772), by Colonel Patrick Ross, mixes Classical with local forms. It preceded by a year the Regulating Act of 1773 which moved the locus of control in India to Calcutta. Nevertheless, Madras continued to grow into one of the finest of all Anglo-Indian cities. Classical buildings serving the Company lined the sea front and by 1800 a house at **Triplicane, Madras**, was being converted and enlarged as a new **Government House** by John Goldingham (1765–1849) (p.1264B). Generally of three storeys, the house has deep colonnaded verandahs, carried on irregularly spaced coupled Tuscan columns. In the grounds, Goldingham added a free-standing **Banqueting Hall** (1802) (p.1264B)—an octastyle Tuscan temple rising out of a single-storey terrace. An arcaded verandah with pilasters rising to a frieze with a balustrade above was added later. Buildings are faced in the white smooth chunam rendering so conducive to the execution of sharp detailing of Classical buildings.

The house in a garden compound was characteristic of the burgeoning Madras, and smaller flat-roofed private residences with Classical and Palladian detailing grew in popularity. Another of these larger semi-urban houses standing in substantial plots of land was modified to accommodate the **Madras Club** (p. 1267A) when it was founded in 1831, and many additions were made to it in various styles between this date and the end of the nineteenth century. One of them was by Robert Fellowes Chisholm (1840–1915), who designed a number of important buildings in Madras, including **university buildings** in the 1860s and **offices for the Board of Revenue** (1870). For the latter he was commissioned to modify and extend an eighteenth-century palace designed in the Islamic style. The result was a mixture of late Islamic forms, motifs and details with Victorian Gothic, in keeping with the existing turreted tower with its superimposed dome raised on an octagonal plinth. Chisholm also built in the Classical and Gothic styles, the latter exemplified in his **Post and Telegraph building, Madras** (1884) (p.1267B).

Following the Regulating Act, the East India Company began to turn more attention to Calcutta, which was named as the location for the seat of the new Governor General. The Company commissioned from Thomas Lyon a large new building to house its clerks—the **Writers' Building, Calcutta** (1780) (p.1268A). It was a simple three-storey building with characteristic Georgian urban proportions, its plain lines broken only by a raised shallow central feature with Ionic pilasters. The building was much modified in the succeeding century, eventually entirely refaced in the late Victorian period and given central and end pavilions with ornate high-pitched roofs.

**Government House, Calcutta** (1799–1802) (p. 1268B), was designed by Captain Charles Wyatt (1758–1819), nephew of James Wyatt (q.v.). The plan is that of Robert Adam's Kedleston Hall, and the impressive gateways (p.1268C) are based on the entrance screen of Syon House. But Charles Wyatt's Palladian house is modified to take account of the climate of Calcutta, with verandahs and a semicircular domed portico. The Governor-General's residence, **Barrackpore House** (1805–23) (p.1269A), by Thomas Anbury (1760–1840) (later Major-General Sir Thomas), stands in a landscaped park on the east bank of the Hooghly, 22 km (14 miles) north of Calcutta, facing Serampore (under Danish control until 1845). The Tuscan-ordered building with a formal pedimented portico on one side rises one lofty storey above a ground floor with arched openings; there is a shallow attic beneath the parapeted flat roof.

**Calcutta Town Hall** (completed 1813) (p.1269B), by Colonel John Garstin (1758–1820), continued in the Palladian mode—another Tuscan-columned structure facing onto the Maidan. From 1780 onwards large **town houses** evolved in the chosen residential areas such as **Chowringhee** (p.1269C). In character they have much in common with the Nash houses in Regent's Park, London, and continued the Palladian tradition introduced in **Warren Hastings's House at Alipur** of 1777. It was indeed not until well into the nineteenth century that the Greek Revival style was introduced, for example in the **Silver Mint, Calcutta** (1820s), by William Nairn Forbes, and continued in the 1840s in such buildings as the **Public Library, Calcutta** (1844) (originally Metcalf Hall), by C. K. Robison (d. 1850).

The neo-Classical architecture of the eighteenth and early nineteenth centuries was more widespread, of course, than only the main centres of British activity in Madras and Calcutta. British Residents in other towns vied with each other to build fine, impressive government buildings. Examples were the splendid Palladian **Residency at Hyderabad**, begun in 1803 (p.1271A), designed by Lieutenant Samuel Russell, and **Government House, Mysore** (1805) (p.1271B), originally designed by the Resident himself, Colonel Wilks, in a Tuscan Doric style; there were later additions by de Havilland.

The full weight of mid-nineteenth-century eclecticism did not much impinge upon Indian neo-Classicism until after the transfer of power from the East India Company to the government at the end of 1858. It is exemplified in the work of Walter L. B. Granville (1819–74) who was well able to move out of the scholarly Classical style used in his fine **Post Office, Dalhousie Square, Calcutta** (1868) (p.1272A), and immediately into the Gothic of his **High Court buildings, Calcutta** (p.1272B), also built in the 1860s. By this time, however, interest was moving away from strife-torn upper India to the vigorous commercial centre of Bombay.

There had been an early settlement on the island of Bombay (see p.1180), and it had consistently remained successful in trade right into the early nineteenth century, though overshadowed by the growth of wealth and power in the eastern and north-eastern regions. In the early 1860s the old walls of the fort at Bombay were finally demolished and the way was cleared for the extraordinary urban development of the next half-century or so.

The **Town Hall, Bombay** (begun 1820) (p.1271C), by Lieutenant-Colonel Thomas Cowper (1781–1825), preceded this development. It is a distinguished Greek Revival building with a Doric order rising through two storeys above a rusticated ground floor, carrying pedimented central features on each side of the building—that on the entrance facade approached by a flight of steps the full width of the octastyle portico. Window canopies to the *piano nobile* were included in the original design of the building, which was completed by others after Cowper's death.

The first major urban development, **Elphinstone Circle** (p.1273A), was designed as a deep crescent of commercial buildings with the Town Hall at its open end. It consists of individual buildings in a wide range of Renaissance and Victorian Gothic styles, mostly with arcaded verandahs or covered balconies of imported prefabricated ironwork.

There followed in Bombay during the 1870s what would have been a spectacular achievement in realising a range of major public buildings in any context (p.1273D)—much more so in what began as little more than a trading settlement, even though a successful one. Within ten years or so Henry St. Clair Wilkins (1828–96) (an engineer, later General Sir Henry) had produced the **Public Works Office** (1872), and the new **Secretariat** (1874) (p.1273D), both typical of the contemporary High Victorian Gothic buildings being erected in London with their polychromatic arch voussoirs and spandrel panels and their high roofs; James Trubshawe had built the **Post Office** (early 1870s) (p.1273B) and the **Telegraph Office** (1874); the **Law Courts** (1879) (p. 1273C) had been built by Lieutenant-Colonel William Augustus Fuller (1828–1902), an engineer who had worked with Wilkins, as a vast, stone, mainly four-storey building with dormer windows in a high-pitched roof, the eaves of which are not only set behind but raised above the level of a balustraded parapet—the wholly Victorian Gothic composition is symmetrical about an enormous square central tower with an overwhelming high roof, pinnacled corner turrets responding to the adjacent octagonal corner staircase towers; and last but not least in this long line of major structures, Sir George Gilbert Scott had designed and others had built **Bombay University Convocation Hall** and the **University Library** with its tower (1878) (p.1273D). The hall is in a French Gothic style, with a balustraded apse, its windows reminiscent of the aisles of Bayeux, and the library is part-Venetian, with corner staircase towers with spiralling arcades and a very tall square clock-tower, the middle levels of which are reminiscent of Giotto's tower, Florence Cathedral.

The remarkable range of secular Victorian Gothic buildings in Bombay included the **Victoria Railway Terminus** (completed 1887), by Frederick William Stevens (1848–1900). Though influenced by British railway Gothic, it is a splendid and stylish building in its own right, as are the numerous small stations, also in the Gothic style, along the two Bombay lines. The Gothic precedents of the Victoria Terminus are in no way belittled by the minimal introduction of Indo-Islamic character—a reflection of Stevens's interest in linking indigenous to European forms. This was a development to continue from this time and into the twentieth century in buildings such as the **Law Courts, Madras** (1892), and the **National Art Gallery, Madras**, both by Henry Irwin (1841–1922), and later in Hyderabad and elsewhere by such architects as Vincent Jerome Esch (1876–1950).

Even during the second half of the nineteenth century, however, neo-Classical and Italianate buildings were built. In the towns, barracks seemed to lend themselves to a simplified arcaded style, well exemplified in the **Chevron Barracks, Colombo, Sri Lanka** (early nineteenth century) (p.1275A), and later in J. G. Smithers's **Museum**, also in **Colombo** (1876) (p.1275B): the rusticated ground floor carries arcaded verandahs recalling those in the courtyard of the late sixteenth-century Palazzo Borghese in Rome, though the Ionic order is of less light and elegant proportions. The central entrance feature above the *porte-cochère* is pedimented and the whole building has a parapet balustrade concealing shallow pitched roofs. A somewhat earlier, more distinguished and reminiscent example of the Italianate style in India is **Government House, Poona** (p. 1275C), with its tall tower. It was designed in the 1860s by the Bombay architect, James Trubshawe. But palazzo architecture of some distinction is to be found in town houses (p.1275D) built well into the twentieth century in many parts of the region, usually the work of unknown architects or engineers employed by the government.

Other urban buildings which helped determine the character of towns in the late eighteenth and early nineteenth centuries were hotels and department stores. The list of hotels is long and distinguished and includes the **Grand Hotel, Calcutta** (p.1277A), the **Taj Mahal Hotel, Bombay**, the **Coromandel Hotel, Madras**, and the **Grand Orient (now Taprobane) Hotel, Colombo** (p.1276A). The symbolic content of the facades (aimed at raising the interest of visitors seeing the hotels for the first time, often from the sea) was considerable and varied, and it is apppropriate that there are several examples, including the Taprobane, in which ground-floor arcades cover the public footpaths to provide shade: the latter example is in the same street and adjacent to **Cargill's Department Store** (p.1276B), which was established in 1844; the present building from the turn of the century also boasts cloistered pavements, and despite its rusticated arches, low-relief panels and segmental pedimented features at parapet level, retains a suggestion of oriental imagery. The glazed roof serves to illuminate a translucent ceiling dome to bring daylight deep into the building.

Perhaps the most widely influential building type developed in the European colonial period in India is the bungalow. The word came to be used by the British to denote any house shaded from the sun on one or more of its walls with an open-sided, roofed area called a verandah. The building type was exported to every part of the world to which the British went, as well as to Britain itself. In this region the bungalow was built in town, cantonment and hill station from the north to the far south: examples are a **bungalow in Punjab** (early nineteenth century) (p.1276C) in the north, and a somewhat later **bungalow near Kandy, Sri Lanka** (p.1276D). These by no means cover the historical or the stylistic range, which runs from early neo-Classical in the seventeenth and eighteenth centuries to picturesque, Gothic or merely traditional to the location, but they give an indication of the variety, examples of which are given in other chapters of this part of the book.

The integration of Islamic and Hindu architectural character with the European styles has been briefly mentioned above, and it was attempted with varying degrees of success towards the end of the nineteenth century. The building which best expresses pride in imperial achievement in India is the **Victoria Memorial, Calcutta** (completed 1921) (p.1277B), by Sir William Emerson (1843–1924), which also succeeds in making wholly integrated though clear references to Moghul Islamic features.

It was, however, left to Sir Edwin Lutyens (1869–1944) to produce the masterpiece in which a genuine Anglo-Indian character was achieved in the combination of domes, minarets and Renaissance details of **New Delhi** (1913–30) (p.1278A). The impressive administrative centre, planned as well as designed in its architectural form and detail by Lutyens, follows Classical axial principles. The new city lies some 5 km (3 miles) south of the walls of Delhi. The main axis runs east and west for some 3 km (2 miles) as a wide tree-lined avenue, flanked by green spaces and canals. At the 'foot' (east end) stands the **All India War Memorial Arch** and, to the west, below the natural ridge carrying the **Secretariat**, there extends an open square ornamented with six fountains, to the north of which is the circular **Council House** (1920) by Sir Herbert Baker (1862–1946) (p.1278B). The axis then rises westward between the twin buildings of the Secretariat, also designed by Baker, towards the vast **Viceroy's House** (1920–31) (p.1279A), which despite its size remains hidden until almost the last moment by the rise of the site. The brilliant use of colour—red sandstone with lighter coloured stone bands—in relation to the simple outlines and the happy combination of local techniques of providing essential shade with Indian motifs in the detailing raise the Lutyens buildings to a unique level of architectural achievement.

Many of the new buildings in the city, however, were designed by another British architect, Robert Tor Russell (1888–1972). Amongst other buildings he was responsible in the 1920s (p.1279B) for those surrounding **Connaught Place**, one of the main public open spaces of New Delhi, planned as a circular piazza. The usual urban functions, such as shopping and hotels, were housed on two floors with open colonnades to the street. He also designed **Flagstaff House** (1930) (p.1279C), the residence of the Commander-in-Chief, another fine two-storey building with a first-floor colonnade of elegant coupled columns and a ground floor arcade on double piers.

## Other European Settlements

The Danes were trading on the river Hooghly as early as 1620 and founded a settlement named **Tranquebar** and a century later **Frederiksnagore**, later renamed Serampore, near to Calcutta. Permanent buildings in the neo-Classical style were built in **Serampore**, of which the best-known is the **Church of S. Olav** (1821). Serampore was ceded to the British in 1845.

France had founded **Pondicherry**, a hundred miles south of Madras, by 1674, and **Chandernagore** in Bengal followed in 1690. Pondicherry was the main French settlement on the Coromandel coast and had a small star-shaped fort which was expanded and improved during Lenoir's governorship in the early eighteenth century. Long ramparts linked the fort to two large urban precincts. Chandernagore was a simple fortified enclave on the Hooghly, its high walls pierced by a monumental Baroque portal leading to the main administrative building on the opposite side of the compound. It was destroyed by the British in 1758. The conflict with France ended and her armies withdrew from India after the British recaptured Madras in 1761.

## South-east Asia

The European powers engrossed in their colonial expansion almost every part of south-east Asia before the end of the nineteenth century. The Portuguese, Dutch, British, French and Danes have been mentioned above, and to this list must be added Spain and later Germany (to say nothing of the non-European powers—Japan and the USA—in the 1890s). Each produced buildings bearing its own national image. As well as the settlements mentioned earlier in this chapter the Portuguese established an early coastal colony at Malacca (south-west coast of modern Malaysia); the Dutch were also early in the islands of present-day Indonesia and remained until after World War II; the British were in Burma and Malaysia including Singapore; the French were in present-day Thailand, Laos, Vietnam and Cambodia, and the Spanish were in the Philippines.

The Portuguese held Malacca from 1511 to 1641: they constructed a six-bastion **fort on S. Paul's Hill, Malacca**, which enclosed five churches, palaces and a hall for the Council of State. The fort and its buildings were demolished by the British in 1807: only the Porta de Santiago with its Portuguese coat-of-arms remains today. The British Residency stands on the site of the main fort buildings on S. Paul's Hill. **S. John's Fort, Malacca**, was one of a chain of Portuguese strongholds which protected the seaward approaches to the port.

The remains of a fine Portuguese church stands at the top of Residency Hill in Malacca. **S. Paul's Church** was first built as a chapel in 1512 and was originally dedicated to Our Lady of Grace. S. Francis Xavier used the church during his visit to Malacca, and his remains were interred here for a short time before being transferred to Goa. Although in ruins, the facade, complete with pediment, is still impressive. The walls were of laterite blocks and the floor was tiled with coloured mosaic. The **Church of S. Peter's, Malacca**, was built in 1710. Although built in the Dutch period in Malacca, the front of the church is a mixture of eastern motifs with the Portuguese Baroque architecture of the period.

The walled city of Intramuros on the island of Manila in the Philippines is an example of a typical Spanish settlement in Asia. The city consisted of **Fort Santiago** to the north-west and a residential area to the south. The fort, whose battered laterite walls were 6 m (20 ft) high, was entered through a entrance portal framed by four fluted pilasters. Two Spanish soldiers modelled in stucco guarded the entrance and a cornice above them supported two lions.

Another survival in the Philippines from the early period is the **Paoay Church, Silocos Norte**. The squat three-tiered bell tower had a domed roof and false arched windows at the lower levels. Both church and campanile were constructed in brick.

**S. Pablo de los Agustinos Calzados, Manila** (*c.* 1590), by J. A. de Herrera (perhaps related to Juan de Herrera, the architect of the Escorial), is a three-aisled church of sober Classical character, the side aisles occupied by intercommunicating chapels.

The Dutch established many fortified trading posts and factories in the Moluccas, Java, the Celebes, Sumatra, Borneo and other islands in the region. By the end of the seventeenth century they were constructing more permanent factory forts. **Kasteel Orange**, a fort on the island of Ternate in the Moluccas, was built by Cornelis Matelieff de Jonde, Jnr, in 1607, and an additional sea bastion was erected in 1636 by Gijsbert Van Lodestein. It was restored in the eighteenth and nineteenth centuries. The plan of this fort was rectangular, approximately 200 m × 130 m (650 ft × 420 ft), with corner bastions, one of which extended to the sea bulwark. The rampart consisted of double walls with stone infill and a vaulted corridor below. The area enclosed was laid out on a grid-iron plan similar to those in vogue in Europe at the time, and the roads were bordered with shade trees.

**Fort Vredeburg in Jogjakarta, Java**, Indonesia, is an inland fortification. Built in 1760, it had a rampart with bastions and a large arched gateway at its entrance framed by four masonry columns supporting a heavy pediment. The buildings within consisted of two-storey warehouses and offices and single-storey dwellings. Colonnades of the Tuscan order carried moulded archways, and roofs were covered with terracotta tiles.

In Batavia, begun in 1619 (now Jakarta, the capital of modern Indonesia), the Dutch colonists set about creating an eastern Amsterdam and in so doing established the grandest Dutch city in the east. Typically it consisted of intersecting canals and narrow streets set in a grid-iron pattern. Canals played an important role in internal communication, laundering, bathing and waste disposal. The **President's Office and the Penang Gate** (1671) were prominent edifices on the Kastel Plein, the city square. Other buildings included the **house of the Governor General** (1708) and the **Town Hall** (1710).

**Christ Church, Malacca**, was built by the Dutch in 1750, more than a century after taking the town from

Marrast, 1915), and the **Post Office, Rabat** (J. Laforgue, *c.* 1920). The **City Hall, Casablanca** (M. Boyer, 1931) echoes the character of Moroccan palaces, especially in the arcaded courtyard; horseshoe arches are repeated along the entire length of the **Administrative Buildings, Bamako**, Mali (*c.* 1930) (p.1387B), and they are incorporated more elegantly in the contemporary **Law Courts, Segou**, Mali. The Arabic style was still an influence in Cairo, and it was used with great success in the **Bank Misr** (A. Laseiac, 1927), the **Waqfs Ministry Building** (1925) and the **American University** (1932). Religious buildings too, for example **Jamia Mosque, Nairobi** (1925–33), were faithful to tradition.

The occupation of Libya and Somalia by the Italians after World War I resulted in the founding of new **agricultural villages** based on planned centres (for example, **Oliveti** and **Mario Gioda**, designed by U. Di Segni), in which the architecture resembled that of the new towns in the Transpontine region of Italy such as Aprilia and Pontinia. A new town of **Tripoli** was planned alongside the old (A. A. Novello and O. Cabiati), with a central piazza in which were built a **cathedral** in the Lombardic style (F. Di Fausto 1924–32), a **governor's palace** and the **Bank of Rome** (A. Limongelli, mid-1930s) (p.1387C). The occupation of Abyssinia in 1936 produced more plans for Addis Ababa (I. Guidi and C. Valle) and other towns, in which there was a clear demarcation between the European and the native districts.

To some extent the new buildings were influenced by the quality of 'mediterraneità' claimed by the Rationalist architects of the 1930s (houses in Somalia designed by C. A. Rava, for example), and something of the character of South Italian towns was exported abroad. The architectural style in which the new administrative buildings were designed was defined in 1936 as 'il grande spirito classico', representative of Roman civilisation. Nevertheless, modern technical resources were to be incorporated, and there were references to considering the climate and the character of the surroundings. Ottavio Cabiati wrote, 'As the Italian language is now spoken in Tripoli and Benghazi, just as in Rome, so should the Italian architectural style be used.' A so-called *Manifesto dell'architettura coloniale* (1936) written by Giovanni Pellegrini amplified this belief, and grand stripped-Classical schemes for Addis Ababa were prepared in 1939—an imperial palace (Guidi, Vale, Ulrich and Cafiero), government offices (Guidi and Valle), and a town hall (Ceronconi)—but these remained a De Chirico-like dream of long colonnades in a sun-baked land.

The Modern Movement was making its effect felt in Africa in the early 1930s, principally in Algeria where the first *Cité Moderne* exhibition was held in 1933; but even in the relatively highly developed South Africa the lateness of the introduction of industrialisation meant that craft traditions persisted longer than in western Europe and the United States. Nevertheless, there were some innovations introduced from France. Auguste and Gustave Perret were working in Morocco, most notably on the dock installations and warehouses at Casablanca, as early as 1915; and in the 1920s they collaborated with M. J. Guiauchain on the construction of the **Palais du Gouvernement Général in Algiers**. In 1933 Le Corbusier made abortive plans for urban development around Algiers itself and also for a new town, Nemours, on the Mediterranean coast; the latter was intended to occupy an amphitheatre site facing the sea and was based on new town-planning concepts. In 1938 he made more abortive designs for housing in Algiers which was intended to integrate with the old town, although the effect on it of a proposed skyscraper would have been dramatic. *Poésie sur Alger*, published in 1950, is the only tangible result of all this, but there were indirect consequences.

The implementation of the official planning proposals for **Algiers** in the 1930s introduced some new architectural styles. The **Foyer Civique** (L. Claro, 1935) was designed to incorporate exhibition and conference rooms, municipal offices and a music conservatoire, and its style was described as a combination of 'l'art moderne et des inspirations de l'art antique'; but the inspiration was not African antiquity. The **Hôtel de Ville** and the Palais du Gouvernement Général (q.v.) were designed in a simplified stripped Classical style with tall attenuated shafts as columns; the latter building was designed around an elegant 'cour d'honneur', but rose many storeys above the town. Other new designs such as the **Maison des Etudiants** (C. Montaland, 1933), with large lattice grilles, and the **'groupe scolaire'** (X. Salvador, 1933) were more obviously influenced by the current images of the Modern Movement; so were schools and houses designed by P. A. Emery in the early 1930s.

In South Africa there was an enthusiastic attempt by a group of young architects (W. G. McIntosh, Norman Hanson and Rex Martienssen) to follow new European models—first those of Dudok, then Gropius and the Bauhaus, and then Le Corbusier with whom they made personal contact. Their designs were principally for houses and blocks of flats with flat roofs, large windows and no decoration; examples in **Johannesburg** are **Peterhouse** (1934–5) and **House Stern** (Martienssen, Fassler and Cooke, 1934–5), **Hotpoint House** (1934) and **House Harris** (Hanson, Tomkin and Finkelstein, 1933), with their obvious debt to Le Corbusier. Despite the French influence on a few architects, the Dutch links were still strong, and the brick architecture of Dudok was the source of such a design as the **Club House of the Technical College, Durban** (Ing, Jackson and Park-Ross, 1938) (p.1388C). The tall vertical blocks of **Escom House** (G. Pearse, 1934) and **Van Eck House, Johannesburg** (P. R. Cooke, succeeded by Pearse

# Chapter 46

# SOUTH AND SOUTH-EAST ASIA

## Architectural Character

The principal buildings of New Delhi, by Lutyens, Baker and others, have been dealt with in Chapter 37 under the general heading of colonial architecture. They are twentieth-century buildings, though for classification purposes more appropriately placed in the earlier position in the book as comprising the architectural apogee of the colonial period in India. In the event, the period was to last for less than two decades after the completion of Lutyens's work, until 1945, the end of World War II and the formal achievement of independence and the partition in 1947. In some parts of south-east Asia, however, French and Dutch as well as British dominion was to last well into the 1960s. Only Hong Kong, occupied as a Treaty Port since 1841, still remains under British jurisdiction, an arrangement which is due to terminate in 1997.

In India and elsewhere, the imposition of wholly European models had given way since the turn of the century to a more sympathetic attitude to local building forms, especially those of the Moghul Empire—originally because it was thought that they offered solutions to the problems of providing comfort in the hot arid or humid climates prevailing in the region. Later there began to dawn an understanding of the need to respond to the social and cultural as well as the aesthetic values of Indian civilisation. The forms of Islamic architecture, however, were often applied to purely neo-Classical spatial arrangements. Several buildings in this category are described or mentioned in Chapter 37, for example public buildings in Madras by Robert Chisholm and Henry Irwin and in Hyderabad by Vincent Esch. Islamic forms were used by British architects also in palaces for the Maharajas—that in Mysore by Irwin being a notable and exuberant example. The resulting buildings were referred to at the time as Indo-Saracenic, a term also used in many earlier editions of this book. Throughout this edition, however, the word Islamic has been used in the nomenclature for buildings in countries where the Muslim religion prevails or where Muslim dynasties influenced events. New Delhi itself is perhaps the most distinguished example of integration of Islamic symbolism with Classical forms and even holds subtle echoes of Hindu motifs—the product is original and dominating architecture, enshrined in buildings of high quality.

In India, the status of engineers was modified to the extent that Consulting Architects were appointed to the central government. Although by the turn of the century Victorian eclectic attitudes to design were beginning to give way to the self-assurance of so-called Edwardian Baroque, efforts continued to be made to incorporate Indian forms into the design of a growing diversity of building types. This was true of both private and public architects whose work, though to some extent overshadowed by Lutyens and Baker, nevertheless produced notable buildings in the years up to the beginning of World War II, and in some cases also after it had ended. Amongst this number were the first Consultants to the Government of India, James Ransome (1865–1944), who served from 1902 to 1908, and John Begg (1866–1937), who succeeded him and served until 1921. The former designed buildings in a number of styles, including several in a popular picturesque manner. Begg spent a few years in South Africa before going to India, where he worked first in Bombay. He too was capable of producing buildings in several styles and was one of those who sought a means of incorporating the forms of Moghul architecture into the public buildings for which he was responsible. He was consultant to the railway and worked for the Post Office as well as designing many fine buildings, including a hospital and medical school in Delhi and several colleges. Both architects worked in Burma as well as India. The tradition of distinguished public service in architecture was continued into the 1930s by another Chief Architect to the India Government, Robert Tor Russell, the designer of Connaught Place (q.v.) and other buildings in New Delhi.

The influence of Lutyens and Baker persisted in the work of government and private architects but was much reduced after World War II, although a few British architects worked on in India, Sri Lanka and other south-east Asian countries after independence. But in common with most countries newly independent of colonial control, the first few decades have been marked by a continuation of the International Style introduced by European architects in the 1930s and continued through the 1950s, '60s and '70s, both by local architects trained in Europe, Australia or America and by expatriate architectural practices commissioned by governments or institutions. It would be difficult to find a public building or a major housing project of the period which does not reflect contemporary European architectural ideals.

There are a number of factors which explain the acceptance of the International Style on such a scale by Third World countries in the period of up to forty years since independence. They include the perception of modern buildings as symbols of progress, the mode of financing major developments through international agencies, and perhaps also the fact that the decision-makers are often those who have spent long periods in Western countries in education and training programmes; indeed a Westernised environment had been superimposed already to a major extent upon their homelands in the colonial period, especially in urban areas. It is surprising, nevertheless, that those responsible for selecting the creators of their greatest national symbols, the new capitals, turned to Europe and America—not that anyone would apply the International Style label to the work of Le Corbusier or Louis Kahn, though it may well be applicable to some of the buildings designed by inernational practices to fill the grids of Doxiadis's Dynapolis, the combined linear towns of Rawalpindi and Islamabad.

In the years of planning and (so far) partial implementation of the new cities, the availability of local qualified architects has improved. The number of architectural schools in the region has increased, as have the numbers receiving architectural education abroad, resulting in a growing body of architects designing buildings in their own countries. In many cases, of course, even education patterns have been geared to the production of buildings in the International Style, and the impact is of necessity gradual rather than spectacular, but many changes are already apparent and others are imminent. The leaders of such movements, such as Charles Correa in India, are motivated by the desire to provide environments suited to indigenous cultures and modes of living as well as to climate and locality. They base their work upon the needs of enormous and still-growing deprived populations and upon the economic realities of development finance in the Third World. Meanwhile, high-rise Bombay (p.1484A) and the thriving commercialised city-states of the region, independent Singapore (p.1484B) and still-colonial Hong Kong, taking advantage of locational, strategic or economic factors, have experienced unprecedented urban development, rivalling even European and American urban centres in their rate of physical growth.

## Examples

Although New Delhi has been largely dealt with in Chapter 37, it would be remiss not to include here references to the work of two architects associated with the offices of Baker and Lutyens respectively, Henry Alexander Nesbitt Medd (1892–1977) and Arthur Gordon Shoosmith (1888–1974). Medd worked in both Delhi and Calcutta and is now remembered for his **Cathedral Church of the Redemption, New Delhi** (1928 onwards), its soaring composition rising to a dome with cupola on a low circular drum, the whole elevated on an octagonal storey with recessed windows above the square crossing tower. It is reminiscent of Palladio's Il Redentore in Venice (q.v.). Other buildings by Medd include the Roman Catholic **Church of the Sacred Heart, New Delhi** (1934), and the **New Mint, Calcutta**. Shoosmith's **Garrison Church of S. Martin, New Delhi** (1928–30), is a massive unrelieved brick fortress-like building with plain battered walls and undecorated openings, recalling the great pylons of Edfu (q.v.). Its scale is vast and in the true Lutyens New Delhi spirit but also imbued with the industrial aesthetic and a nascent modernism.

Several of the south-east Asian countries remained under British and other colonial administrations for up to twenty years after the end of World War II. During this time many buildings were put up in the anonymous colonial modern practised by European architectural firms, whether based in their own countries or abroad, or by architects employed by government (for example, in the Public Works Departments of British colonial administrations). Among the better examples in Malaysia (Malaya before 1957) was work of the PWD in such buildings as **Kuala Lumpur Airport** (architect P. S. Merer), or of private architects Booty, Edwards and Partners in their pleasant **verandah houses in Kuala Lumpur** (p.1485A). In Singapore in the 1950s a number of housing schemes were implemented: among these were **four-storey walk-up apartment blocks, Queenstown** (p.1485B), some of them by P. R. Davison of the Public Works Department, others by Lincoln Page of the (then) Singapore Improvement Trust. Those by the former have fenestration arrangements which recall Highpoint, Highgate, London (q.v.), an impression reinforced by the flat treatment of the facades which also respond to climate in their shuttering and louvre arrangements; those by the latter are more conventional by European standards of the 1950s. James Cubitt, Leonard Manasseh and Partners carried out work in south-east Asia as well as Africa: one of the more acceptable small buildings of this brief period is their **Broadcasting Studios at Kuala Belait, Indonesia (Brunei)** (1958) (p.1485C).

Much of the discussion of urban planning and architecture in India, Pakistan and Bangladesh in the post-colonial period has centred on the three capitals commissioned since 1950. The first was Chandigarh in the Punjab, the region of India which had suffered most in the conflict which preceded the handover of power in 1947 and whose regional capital had been included in Pakistan. Le Corbusier was appointed to prepare a master plan and as architect for the buildings on the Capitol of Chandigarh in 1950. On the recommendation of Le Corbusier, his cousin and associate Pierre Jeanneret and the British firm of Maxwell Fry and Jane Drew were appointed to work with him in Chandigarh and to spend longer periods in India to supervise the work than were possible for Corbusier himself. He himself worked on the Capitol buildings, the Secretariat, the High Court, the Assembly Building and the Governor's Palace until his death in 1965, during which time only the first three of these were realised.

The **Secretariat, Chandigarh** (completed 1958) (p.1487A), is a familiar Corbusier building in rough concrete with its bold brise-soleil rhythm broken twice along its enormous, 254 m (833 ft) length, once for the double-height ministerial offices and again for the perforated ramp access tower, used by the majority of the building's 3000 occupants, although there are lifts near the centre of the building. This main south-east facade of the Secretariat is parallel with and west of the Capitol's main axis, which links the High Court and the Assembly buildings. All the roads intended for wheeled traffic on the site are sunk below ground level to reduce visual and aural intrusion.

The **High Court, Chandigarh** (1956) (p.1488A, B), is a giant parasol-like shelter from the rigours of the Punjabi climate; it houses a high court and eight subsidiary courtrooms with their supporting administrative and records offices. The elevation to the main axis is a monumental framed brise-soleil, behind and through which rises a series of solid-sided ramps serving each floor. But the design of this and other buildings seems to be the realisation of architectural theories published a year or two previously, very much as the master plan for Chandigarh brings to fruition the ideas enshrined in the Athens Charter which stemmed primarily from the acceptance of Corbusier's proposals at CIAM IV in 1933. The use of his dimensional system (the Modulor), published a year or two previously, is not consistent throughout the design, and attention has often been drawn to the illogicality of the whole composition of the Capitol, admittedly, partially as a result of the absence of the Governor's Palace, one of the key elements in the spatial arrangement of the major buildings. The roof of the four-storey **Assembly Building** (completed 1964) (p.1489A) is pierced by the circular (on plan) hyperbolic shell of the Assembly Session chamber and by the three-sided pyramidal roof of the Council Chamber. Once again the entrance front is dominated by a sculptural convex shell forming a canopy above massive concrete vanes. The forum area between the chambers is crossed by a complex series of ramps communicating with the offices. Whatever the criticisms of Corbusier's Chandigarh may be, however, the power of the buildings and their definition of space on the Capitol is not to be denied.

Both Pierre Jeanneret and Maxwell Fry designed housing in Chandigarh, and indeed Fry showed much concern for the people of the villages which once occupied the land on which Chandigarh was built. He produced many standard houses, one of the most successful of which was the **two-storey terraced housing** (p.1487B) built in the mid-1950s, which has screened sleeping terraces on the roof.

Following the partition of India, a number of schemes evolved for the development of Karachi into a prestigious capital for the new Islamic state of Pakistan. But when Field-Marshal Ayub Khan seized power in a military coup in October 1958 he chose a site for a new capital adjacent to the cantonment area of Rawalpindi, some 2250 km (1400 miles) north of Karachi in the shadow of the Kashmiri mountains, on the Great Trunk Road on the historical Moghul route into the Indian subcontinent. Doxiadis Associates had been appointed consultants for a self-help **satellite township at Korangi, near Karachi** (1959), making a start on the burgeoning refugee problem. The simple emergency housing was rapidly completed, and later in 1950 Doxiadis was also commissioned to design the new capital, Islamabad.

In 1960 Doxiadis was appointed to construct the first 5000 **houses for low-income families, Islamabad** (1965) (p.1488C), which he did in accordance with his strictly hierarchical category schedule relating house sizes to income. The houses, set out in closely spaced rows along identical pedestrian streets, provide little opportunity for movement in the local environment or for personalisation of the units. Gerard Brigden, an architect employed under the Colombo Plan, has designed **courtyard houses** and related them in groups to community buildings. Assisted by Colin Franklin, in a Class III centre in Sector G7 of the new city, Brigden has sited the **houses around a small arcaded market place** with amenities such as a tea room and a sitting area for public use.

Both local and expatriate architects have designed public buildings at Islamabad. For example, the **mosque in the Class V centre of Sector G6** (p.1489B), is by an indigenous architect, Zaheer-ud-Din Khwaja and demonstrates concern for the purity of Islamic forms. Gerard Brigden's **Government Hostel** (1968) (p. 1488D), landscaped by Derek Lovejoy, sited in the zone set aside for important national buildings, is informed by local models and turns inwards to create cool screened walkways, planting and pools to create cool and shaded outdoor spaces. The **Secretariat, Islamabad** (1963–7), is an enormous building of many blocks with angle towers housing stairs and lifts, designed by the Italian team Ponti, Fornaroli and

Rosselli. Seen from a distance with its corner towers, it is reminiscent of an early Islamic caravanserai, but in reality the building consists of a number of standard rectangular and L-shaped office blocks with a little applied Islamic surface decoration. The **Hotel Shahrazad, Islamabad** (p.1491B), by Gio Ponti (1891–1979), is a more successful building with a plain and flat-surfaced facade facing the hills, and a street front resembling an ocean liner, its rooms and balconies behind characteristic windows punched through the thin concrete skin. As well as unfinished projects such as the **National Library** by Robert Matthew, Johnson-Marshall and Partners, there were rejections of schemes by distinguished European and American architects, for example Arne Jacobsen's parliamentary building and three alternative proposals by Louis Kahn for the same building.

For completed Kahn buildings it is necessary to turn to Bangladesh, where he was appointed in 1962 to plan an administrative and cultural centre for a new Second Capital (of East Pakistan as it then was) on a site to be called Ayub Nagar, some miles from the late nineteenth- and early twentieth-century British centre of Dacca, with its mainly red brick and stone buildings, many of which exemplify the attempts to integrate Indian forms and motifs mentioned above. Kahn presented his proposals in 1964 and the first civil servants moved into accommodation he had designed in 1967, some four years before Bangladesh became an independent state with Dacca as its capital. Louis Isadore Kahn (1901–74), like Le Corbusier, whilst setting out to meet the needs of the programme, used his commissions in the subcontinent to work out the theoretical positions developed over the previous quarter of a century. The **National Assembly Building** (1964–) (pp.1489C, 1491A), the climax of the array of buildings which were also to include the high court, diplomatic enclave, hostels, schools, a stadium and a market as well as living accommodation, consists of an octagonal assembly chamber surrounded by circulation areas and galleries. Above the latter space are devices which, as well as creating shadow and visual excitement, lead light into the heart of the building; in Kahn's own words they are '. . . screens which sieve the light through round holes and transform the room underneath into a "treasury of shadows"'. The **Secretaries' Hostels** (1968) (p.1491C,D) and the **Hostels for Members of the National Assembly** (1968) (p.1492A) are amongst the best of the residential buildings, and carry through the same aesthetic as the Assembly Buildings.

Both Le Corbusier and Louis Kahn also designed buildings at Ahmadabad, a thriving industrial town in the Gujerat. Le Corbusier's **Headquarters Building for the Millowners' Association** (1954) (pp. 1492B, 1493A) is sited in a garden overlooking the river, with brise-soleils on east and west facades and a roof garden. There is an impressive meeting hall panelled in timber. He also designed and built the **Museum** in the Cultural Centre at Ahmadabad, a massively square brick building with a water-filled concrete roof above an open attic storey. The **Indian Institute of Management, Ahmadabad** (1963) (p.1493C), by Louis Kahn includes a school, dormitories and teachers' residences grouped around a lake in such a way as to foster the penetration of cooling prevailing winds. Again brick is used as a structural material. Charles M. Correa designed a **Hotel at Ahmadabad** (p.1492C) in the 1950s, also overlooking the river, in an original version of the International Style with open galleries behind horizontal concrete louvres, and with deeply recessed window openings, the aim being to control lighting and ventilation through building form.

The work of indigenous architects in this period affords interesting contrasts with that of both Le Corbusier and Kahn. An appropriate institutional example is the **Centre for Environmental Planning and Technology (CEPT)** (1967–81) (p.1493B), by Balkrishna Doshi (b. 1927). The group of buildings includes a school of architecture, a school of planning, a centre for the visual arts and a community science centre together with the necessary service and amenity accommodation such as laboratories and workshops. It is a brick and concrete building with environmentally comfortable shared spaces between buildings; it reflects the handling of scale which was already evident in his earlier work in the 1950s, for example his **Nalini House, Ahmadabad**, when a partner in Vastu-Shilpa Architects.

Most representative of International Style architecture in Pakistan perhaps are commercial and hotel buildings of the last ten to fifteen years by indigenous architects. the **Pakistan Burma-Shell (PBS) Oil Company Building, Karachi** (1976) (p. 1493D), by Habib Fida Ali (b. 1936), an office building won in a limited competition in 1973, consists of two three-storey buildings, one containing offices, the other services such as workshops and stores. Amongst other buildings by Habib Fida Ali is the **National Bank, Quetta** (1981). The **Taj Mahal Hotel, Karachi** (1981) (p.1495A), by Yasmeen Lari (b. 1943), is one of the first major tourist hotels to be designed and built by local architects with only consulting help from abroad, thus reversing what had become normal practice. As well as a 450-bedroom hotel, it is also a conference centre catering for major gatherings of up to 1600 people. It stands on a corner site and is comparable in many respects as an example of the International Style with the **Hyatt Regency Hotel, Delhi** (1983), designed by Jashir Sawhney with landscaping by Kishore Pradhan.

Yasmeen Lari has also produced upper-income housing in both Islamabad and Karachi: an example in the latter location is the **Kahn House, Karachi** (1969), its lime-washed walls with few openings externally, and intimate exterior spaces; this should perhaps be contrasted with some of the middle- and lower-income group housing in which an attempt is being made to return to the cultural as well as physical and climatic bases of development. A recent example in India is the work of Ramjit Sabikhi and Ajoy Choudhury for the New Delhi Housing Society. Their **Yamuna Apartments, New Delhi** (1981) (p. 1495B), is a lower-middle-income group housing scheme in which they have tried to encourage the formation of a local community in an urban village.

There can be little doubt, however, that the work of Charles Correa (b. 1930) in low-income housing, and perhaps more especially his work in New Bombay, comes to mind in any discussion of post-war housing in south-east Asia, and indeed his work has won international acclaim. It is easy to forget that Charles Correa has also designed many distinguished buildings other than housing. His Ahmadabad Hotel has been mentioned above, and an early individual house in Ahmadabad is perhaps representative of the logic brought to bear upon his public housing schemes, one of which, the township at Cablenagar, Kota, gave rise to this commission, the **Parekh House, Ahmadabad** (1968). It has two parts, a summer and a winter section, each designed to make best use of the prevailing seasonal weather conditions. They are reflected in the cross-wall construction and inform the elevational treatment of the house. The development of his approach to housing can perhaps be judged by contrasting this house, which stemmed from the narrow frontage houses of Kota, with one of his most recent schemes, the **Belapur Housing, New Bombay** (1985) (p.1495C). This is incremental, one- and two-storey housing carried out on partial self-design and build principles. Each dwelling from the simplest and smallest single-storey unit upwards has an outdoor living space linked to other similar spaces: there are no exclusive party-walls. The houses are built in locally available materials and are seen as renewable and adjustable to cultural needs.

Charles Correa has also designed and built high-rise housing in Bombay. An example which demonstrates his originality as well as an understanding of location and culture is his **Kanchanjunga Apartments, Bombay** (1980) (p.1495D). Here also the split-level housing units are calculated to produce the most comfortable conditions in a high building facing the sea (and the afternoon sun), and the results are eloquently expressed in the form of the building. Other work from a large range carried out over a period of twenty-five years includes the **Gandhi Memorial Building, Sabarmati Ashram, Ahmadabad** (1962), and the **Crafts Museum, New Delhi** (1979).

In Sri Lanka there are equivalent Edwardian buildings, smaller in scale except perhaps in the business centre of Colombo, and in some government buildings constructed by the Public Works Department. After World War II, and immediately before Sri Lanka became independent, it was decided to initiate a new and modern Sri Lankan university. The site chosen was at Peradeniya, some 113 km (70 miles) from Colombo and 6.5 km (4 miles) from Kandy, the buildings of which provided the style for the university. The new **University of Peradeniya** (1946 onwards) (p.1496A) was designed by Shirley de Alwis and consists of two- and three-storey buildings in the Kandy style with rendered and lime-washed walls and red-tiled roofs, widely dispersed on the extensive, landscaped hill site of 1400 hectares (3500 acres). Peradeniya now forms a fascinating contrast with the new **University of Ruhunu at Matara** (p. 1496B), on an impressive site overlooking the sea on the south coast of the island, by Geoffrey Bawa (b. 1919): the first phase of construction was completed in 1984. Here is the kind of distillation of Sri Lankan traditional architecture so particular to Bawa's work over the last twenty-five years or so. And here also there is a curious echo of what has always been regarded as a modernist **house at Kandy**, designed by Minette de Silva and built in the 1950s (p.1496C).

The combination of brilliant integration of Sri Lankan arts and crafts, modern design in the technical sense and an intensely personal appreciation of tradition, has characterised Geoffrey Bawa's work from its beginning, for example his **classroom extension block, S. Thomas's Preparatory School, Colombo** (1963) (p.1497D), a small concrete building of great distinction with locally executed relief decoration, and has continued to the most prestigious recent work, namely the **Parliament Buildings, Sri Jayawardenepura, Kotte, near Colombo** (p.1497C), on an island surrounded by an artificial lake formed from swampy land, and approached by a causeway. A great flight of steps leads to bronze external doors and a further internal flight to reach the silver doors into the legislative chamber itself, which rises three storeys above the general level housing offices and services. Framed in timber and stone, the main buildings have traditionally-shaped double-pitched roofs clad in copper.

Most of the development in post-independence Malaysia has been in Kuala Lumpur, where many high-rise buildings were constructed in the 1960s, and to a lesser extent in Penang; the work has been carried out largely by architects from outside the country. More recently there have been projects such as the **Wilayah Shopping Centre, Kuala Lumpur** (1983) (p.1497A) by ABC Akitek in association with DP Architects of Singapore. It is characteristic of the urban development of major south-east Asian cities in the 1970s and 1980s—a four-storey shopping plaza divided by a narrow light well, and containing community facilities such as swimming pool, squash courts and restaurants.

Work of the same period in Thailand can be characterised by the buildings of Sumet Jumsai Associates (Dr Jumsai born 1939). The **Science Museum, Bangkok** (1977) (p.1497B), is a teaching centre for